The Network Brokers Handbook

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AN ENTREPRENEURIAL GUIDE TO COOPERATIVE STRATEGIES FOR MANUFACTURING COMPETITIVENESS

By

C. RICHARD HATCH
Center for Manufacturing Systems
New Jersey Institute of Technology

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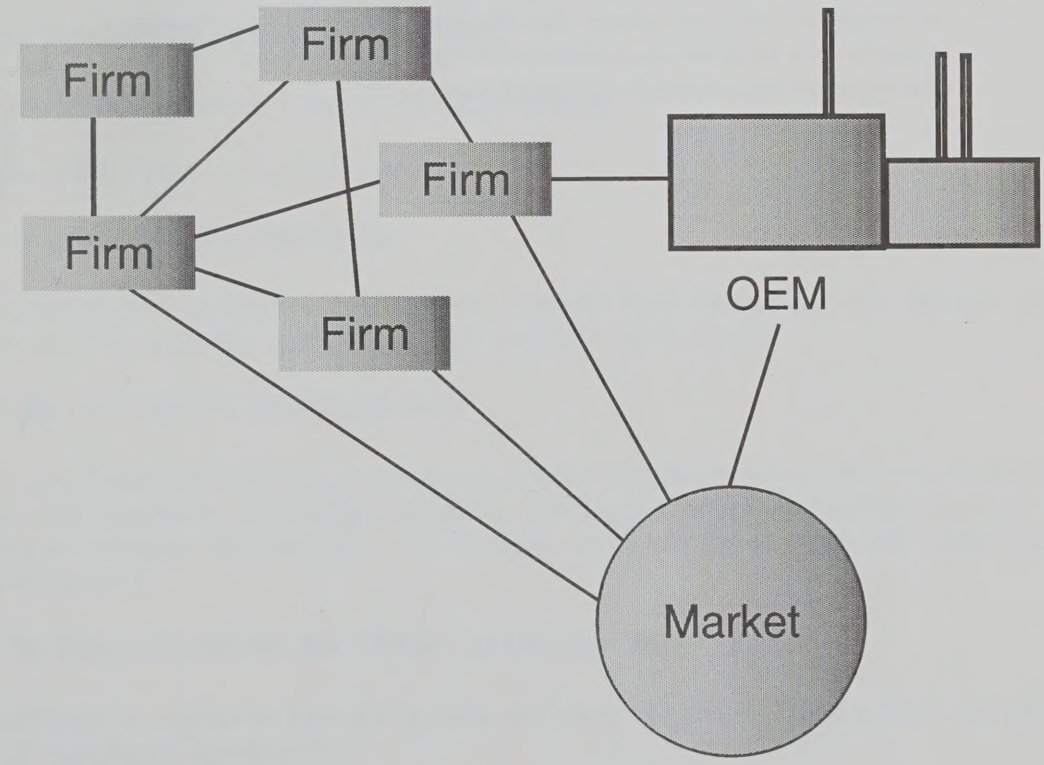
Small firms in networks:



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ABOUT THE AUTHOR

Richard Hatch played a key role in introducing the concept of manufacturing networks into American economic development practice. He is currently the Director of the Industrial Modernization Program in the Center for Manufacturing Systems at New Jersey Institute of Technology. The materials in this Handbook are derived from network broker training programs the author conducted first in Denmark and subsequently in New Jersey, Arkansas, Illinois, and Oregon. The *Network Brokers Handbook* is intended for use by brokers with industry experience, but no formal network training. It is a basic guide to building flexible manufacturing networks in America.

AT A GLANCE....

WHAT IS A MANUFACTURING NETWORK?

A manufacturing network is a group of firms that cooperate in order to compete—that collaborate to achieve together what no single firm could achieve alone.

HOW MANY KINDS OF NETWORKS ARE THERE?

Networks can be divided into two fundamental types: service networks and production networks. Service networks deal with common business functions such as collective work force training, materials procurement, and market development. In production networks, small firms combine complementary skills to create value-added products for new markets.

WHY DO FIRMS COOPERATE IN NETWORKS?

New technologies are being introduced at a dizzying pace. Quality standards continue to rise. Product life cycles are shrinking fast. Markets are increasingly fragmented, but global in scope. In this tough competitive environment, small firms are at risk. Strategic networks give them strength. Through network cooperation, independent companies work together to:

- Reduce costs through joint purchasing of materials and services.
- Acquire the advanced technologies they need.
- Share the mounting cost of research and development.
- Increase market share and export sales.

WHAT IS A NETWORK BROKER?

Network brokers are facilitators and catalysts. Brokers help companies form strategic partnerships, organize network activities, and identify new business opportunities.

WHAT DO NETWORK BROKERS DO?

Brokers spread network concepts, promote cooperation, organize groups of firms, and connect them to the product designers, marketing specialists, training providers, and industry services programs they need to compete successfully. For brokers, networks mean increased effectiveness and a broader client base.

WHAT IS THE NETWORK BROKER'S HANDBOOK?

This Handbook is a guide to identifying industry needs, organizing cooperation, and managing the growth of manufacturing networks.

U.S. business is receptive to the idea of flexible manufacturing networks

- In Hammond, Louisiana, 97 furniture manufacturers from three states formed a network to open a 2,500 square foot *furniture marketing showroom* that displays their high-quality products.

The rapidly growing list of examples demonstrates U.S. business receptivity to the idea of flexible manufacturing networks. Additional examples are contained in the article, "The Power of Manufacturing Networks," included in the Appendix.

WHY SMALL FIRMS NEED NETWORKS

Foreign producers now compete in over 75 percent of our markets for manufactured goods

In the past when large American corporations represented a stable and relatively undemanding market, supplier firms could afford to master business skills one at a time. They could also amortize expensive manufacturing equipment over long runs of similar products. These conditions no longer apply. Foreign producers now compete in over 75 percent of our markets for manufactured goods. Under-developed nations have fast become Newly-Industrialized Countries. Commodity production has shifted to low wage regions—and continues to migrate in search of lowest labor costs. Global competition has compressed product cycles, driven technological innovation, and raised quality standards. Leading U.S. corporations have been forced to downsize and adopt new competitive strategies.

If the biggest firms have been hard hit, consider the difficulties of small manufacturers faced with such challenges as:

- Changes in the sourcing behavior of traditional customers. OEM everywhere are cutting vendors and expecting firms that remain in the supplier chains to provide engineering design and support, as well as Just In Time Delivery—with zero defects.

- The introduction of manufacturing materials and methods that threaten to make their skills and equipment obsolete.

- The growing importance of export markets—and few small firms have mastered the export process.

Networks and competitiveness. It is important to realize that most small firms are contract manufacturers or job shops. They don't sell goods—instead they market basic manufacturing services like plating, milling, stamping, and assembly. Companies in this position in the market face three special problems. Basically, they sell machine time. In economists' terms, this is a commodity. As a result, they are subject to considerably greater competition and price pressure than firms with proprietary products. In addition, many OEM customers now seek to buy complete components or assemblies ready to be bolted into finished goods. Small shops with limited capabilities cannot compete for this business. Lastly, the general decline of United States manufacturing has sharply reduced overall demand. Many smaller suppliers must learn to diversify into new markets if they are to survive.

While the business environment has changed dramatically, the traditional limitations of small firms have not. The key obstacles for small firms continue to be:

- Shallow management depth.
- Limited access to capital.
- Little or no tradition of R&D.
- Inadequate marketing ability.

Networks help firms help themselves

Networks have an important role to play helping firms help themselves adapt to the new competition by:

- Sharing costs and management tasks.
- Linking diverse capabilities to serve new markets.
- Working together to achieve serious economies of scale.
- Collaborating to compete in the global market.

Once numbers of skilled network brokers are in the field, we will begin to see America move forward toward an industrial system in which cooperation is the basis for competitive success

You have an important role to play in building networks. Small firms will need help in understanding the power of networks, finding partners, and carrying out collective business activities. Once numbers of network brokers are at work in the field, we will begin to see America move forward toward an industrial system in which cooperation is the basis for competitive success.

BUILDING NETWORKS IN AMERICA

The *Handbook* follows the steps through which brokers build effective manufacturing networks

This is a practical manual. It is intended for network brokers who will be actively engaged in building the competitiveness of American industry through cooperation. The organization of the **Handbook** follows the steps through which brokers build *effective manufacturing networks.*

The Network Process

Brokers are entrepreneurial, knowledgeable, and committed to U.S. manufacturing.

Step 1: Learn broker skills. Network brokers make a commitment to learning network strategies and organizing skills.

Step 2: Target firms and sectors. Brokers target key industries for network development and research sector structure, conditions, and competitiveness.

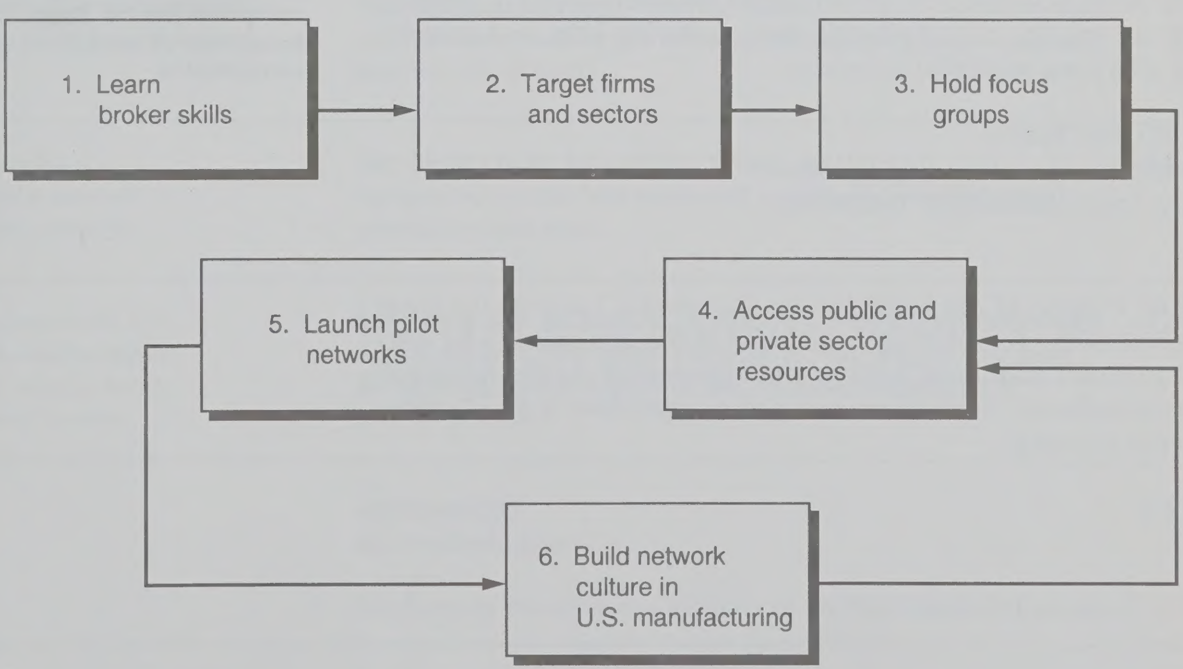
Step 3: Hold focus groups. Brokers organize focus groups to identify target sector firms' common problems and business opportunities.

Step 4: Access resources. Brokers coordinate public and private sector resources networks need to solve common problems and realize new business opportunities.

Step 5: Launch pilot network projects. Brokers demonstrate the value of cooperation through successful pilot projects. Network success brings more and more firms into the process.

Brokers help networks expand, fostering a new industry culture of cooperation, innovation, and competitiveness.

Step 6: Build a network culture. Brokers help networks expand, fostering a new industry culture of cooperation, innovation, and competitiveness. As networks grow in size, number, and scope, resources can be organized to create industry-led network centers where strategic sector services are readily available. More networks are formed. A virtuous circle begins, leading to continuous industry modernization and growing prosperity for the American work force.


1. Learn broker skills
2. Target firms and sectors
3. Hold focus groups
4. Access public and private sector resources
5. Launch pilot networks
6. Build network culture in U.S. manufacturing

TOWARD A U.S. NETWORK MANUFACTURING SYSTEM

In a network manufacturing system, firms remain independent. They solve their day-to-day business problems with the help of close-by sectoral service centers. They hone their specialized skills to a fine sharpness through contact with one another, with customers, and with the best consultants and research institutions. They come together around new market opportunities identified for them by knowledgeable network brokers. They exploit these opportunities singly and together as long as revenues exceed cost. Then they are free to regroup, forming new networks in response to signals coming from markets around the world.

Flexibility is widely said to be essential to manufacturing competitiveness in the present economic environment. If we extend the idea of flexibility from the individual company to the manufacturing system as a whole, we begin to see that a manufacturing economy made up of a great many skilled and flexible firms that readily link together in networks to serve changing patterns of demand attains something very much like hyperflexibility. This is the most appropriate goal for small industrial firms in a ceaselessly changing global economy.

A manufacturing economy made up of a great many skilled and flexible firms that readily link together in networks attains something like *hyperflexibility*

Strategic alliances have become a standard part of the corporate arsenal: General Motors and Toyota collaborate to build cars in California, the Big Three automakers fund joint research on everything from stamping steel to the design of electric vehicles. Similar stories can be told about leading companies in the electronics, computer, and textile industries.

The network broker's job is to bring the theory and practice of strategic cooperation to large numbers of small companies. With your help, networks can spread across the nation quickly, protecting our existing manufacturing base, restoring jobs, and rebuilding a thriving industrial economy.

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New Jersey Institute of Technology

"The Power of Manufacturing Networks," a reprint from TransAtlantic Perspectives is included in the appendix. This article provides additional background information on the subject of this Handbook. You are encouraged to reproduce it for distribution to industry.

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If the issue is selecting firms for initial networks, go directly here.	**SECTION TWO: TARGETING FIRMS** Section two contains information about local industry data sources and provides guidelines for selecting network targets.	**21**
Have firms in mind and need a tool to get started? Begin here.	**SECTION THREE: NETWORK FOCUS GROUPS** Section three is a detailed guide to organizing and running target industry focus groups to spot network potential.	**55**
If your network needs technical, financial, or business assistance, go to this section.	**SECTION FOUR: RESOURCE ACCESS** There are numerous local, state, and federal resources available to help manufacturers. Section four will help you to identify them and deliver their services networks.	**97**
This is the guide to network project planning.	**SECTION FIVE: PILOT NETWORK PROJECTS** Section five contains information and worksheets for making initial network business plans.	**111**
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FIVE WAYS TO LAUNCH

MANUFACTURING NETWORKS

Manufacturing networks are groups of firms that cooperate in order to compete. Here are five ways to start networks fast:

1. Begin with *joint purchasing* of materials, services, or insurance—good ways for local firms to cut costs fast. The metalworking industry story in Section One and the needs survey forms in Section Two will help you get going.

2. Organize *industry focus groups* to identify common needs and common opportunities. Section Three contains focus group guidelines, sample agendas, and handouts.

3. Develop guidelines for *consortial projects* with technology extension, export assistance, and work force training programs—then bring companies together to develop group applications for funding. The industry resources guide in Section Four is the place to start.

4. Design and market a cost-shared, *group service* that addresses a key need such as ISO 9000 training or environmental compliance. Pick a service that draws on your special knowledge of manufacturing competitiveness. Use Section Two to look into critical success factors for local industries. Also see Section Five on service networks.

5. Work with OEM corporations to organize *supplier networks* focused on quality assurance, just-in-time delivery, productivity improvement, and similar group projects. Models for networks and a discussion of pitfalls are in Section Six.

INTRODUCTION

STRATEGIC NETWORKS FOR AMERICA

In our business culture, individual companies are expected to cope by themselves with the massive changes occurring in the competitive environment. Even small firms must independently manage worker recruitment and training, materials procurement, technology selection, environmental compliance, manufacturing operations, product development, marketing, and sales. Many have difficulty managing these complex demands in today's fast-changing economy.

Foreign manufacturing economies have been gaining on the United States by fostering industrial systems in which cooperation is the basis for competitive success

More and more foreign manufacturing economies have been gaining on the United States by fostering a different kind of industrial system—one in which cooperation is the basis for competitive success. In Europe and Asia, business organizations and government programs actively promote interdependent relationships among firms. The end result is that production is organized through consciously-collaborating networks of producers, suppliers, and customers.

In Italy, Germany and Japan, networked companies make innovative products

Flexible manufacturing networks are the leading model of industry cooperation. Ranging in complexity from the regular exchange of strategic information to joint ventures for product development and commercialization, networks represent a general solution to the problems faced by smaller manufacturing firms as they struggle to regain competitive edge. Strategic networks were first observed in prosperous manufacturing regions in Italy, German, and Japan where groups of independent companies routinely work together to share expensive services and technologies and blend complementary capabilities to design and make innovative products.

A NETWORK STRATEGY FOR COMPETITIVENESS

Despite their importance, small manufacturing firms are at risk in today's competitive markets

There are 360,000 small manufacturing firms in the United States. They are the backbone of American industry, employing two-thirds of the blue collar labor force and supplying the bulk of the components used in the production of finished goods for the domestic and export markets. As outsourcing grows among leading American manufacturers, the overall competitiveness of American industry has come to rest squarely on the ability of smaller companies to meet the cost, quality, and delivery demands of major customers. Despite their importance, however, many small manufacturing firms are at risk in today's competitive markets. Small firm productivity lags far behind that of big American firms and competitors overseas. A major effort is needed to upgrade production technology, worker skills, and management practices in hundreds of thousands of small companies across the country.

Traditional industrial extension aims to improve manufacturing companies one at a time

To regain competitiveness, the United States must find a way to modernize thousands of small companies in a relatively short time. Both the scale and importance of the task are huge. Traditional industrial extension aims to improve manufacturing companies one at a time. This process is slow and the results of past projects are mixed. One-on-one assistance may improve the performance of some small companies, but it still leaves them isolated and vulnerable.

Networks focus on groups of firms

Networks focus on groups of firms—even entire industry sectors. This is not only a more efficient approach to modernization, but also one that enables small firms to respond to a host of new and difficult manufacturing challenges. Through participation in strategic networks, small manufacturing firms can:

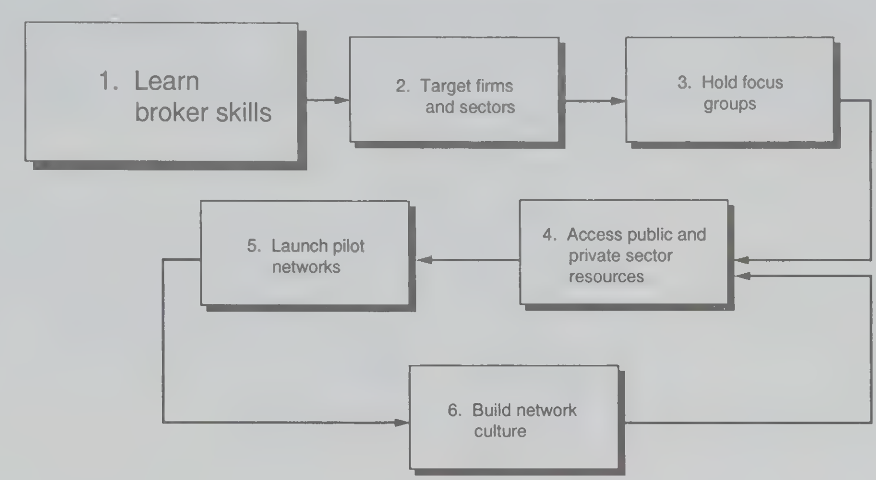
- Keep pace with rising OEM standards.
- Share the mounting costs of technological innovation.
- Combine capabilities to produce new goods for new markets.
- Acquire management, engineering, and marketing expertise equal to that of the best of big companies.

Here are several examples:

- In Portland, Oregon, three jobs shops and a firm of consulting engineers have created a *virtual corporation* in which they link complementary skills to satisfy the prototypying needs of sophisticated customers.
- In Paterson, New Jersey, 25 textile printers and dyers came together around *environmental compliance* issues—and stayed together to create simplified permitting procedures and a new, positive alliance with state government.
- In Chicago, Illinois, the Jane Addams Resource Center created a *neighborhood-based network* of metalworking firms in 1987. Today thirty member companies help one another with labor force recruitment and training, technology adoption, and group purchasing.
- In Fall River and New Bedford, Massachusetts, apparel contractors have formed the Needle Trades Action Project with the International Ladies Garment Workers Union to manage *industry-wide skill training and technology upgrading.*
- In Ann Arbor, Michigan, small firms share the cost of Industrial Technology Institute's professional quality trainers—who help them help themselves through *Continuous Improvement User Groups.*

SECTION ONE:

BROKER SKILLS



UNDERSTANDING THE BROKER'S ROLE IS THE FIRST STEP IN THE SIX-STEP PROCESS OF BUILDING MANUFACTURING NETWORKS. THIS SECTION OF THE NETWORK BROKER'S HANDBOOK EXPLAINS:

- **WHY SMALL FIRMS NEED NETWORK BROKERS**
- **WHAT NETWORK BROKERS DO**
- **HOW NETWORK BROKERS ARE COMPENSATED**
- **WHAT CHARACTERISTICS SUCCESSFUL BROKERS SHARE**
- **WHICH ARE THE MOST COMMON NETWORK MODELS**
- **HOW NETWORKS IMPACT BUSINESS STRATEGY**
- **HOW TO PLAN A FIRST NETWORK PROJECT**

The average factory owner must wear many hats—the result is many strategic tasks are often done poorly or infrequently or not at all

WHY SMALL FIRMS NEED NETWORK BROKERS

You know from experience that even small manufacturing companies are highly complex organizations. The average factory owner must wear many hats—chief executive officer, chief financial officer—and sometimes bookkeeper, too—marketing director, and vice president for personnel. And that's only in the front office. On the factory floor, the same person is often engineer, cost estimator, production coordinator, training director, and quality assurance manager.

Obviously, small firms cannot afford to hire individual specialists to cover all these functions. The net result is that in many smaller firms important tasks are done poorly or infrequently or not at all. Constraints on time often mean that important business opportunities are missed. Good ideas for new products or services or markets go by the board. This is where network brokers come in.

In network building, the broker's task is to:

- Function as a "shared manager," enabling small firms in groups to take on new challenges.
- Identify critical competitiveness problems—and common solutions—through constant contact with firms and their markets.
- Establish regular communication among firms, and between firms and those with whom they need to cooperate—business service providers, labor unions, marketing specialists, product designers, university laboratories, equipment manufacturers, and customers.
- Manage conflicts that may arise among firms more accustomed to competing than cooperating.
- View firms as "packets of skill and equipment" that can be grouped into virtual corporations in response to market signals.
- Overcome obstacles to growth by creating group services—services that no small firm could possibly afford except through network participation.

Network brokers identify common needs and business opportunities

WHAT NETWORKS MEAN TO YOU

Network brokers identify common needs and business opportunities. Brokers bring potential partners together and help them find the resources they need to succeed in the marketplace. Many different kinds of people connected to manufacturing industry have found that network development represents an opportunity for increased impact. For example, if you are the:

Owner of a Manufacturing Firm

Networks are a means to share the management burdens and reduce the costs of technology adoption, work force training, and marketing

Networks are a means to share the management burdens and reduce the costs of technology adoption, work force training, and marketing.

In Oregon, the owner of a metal fabricating company formed a vertically integrated network of specialist firms to bid successfully on high-margin OEM work.

Director of a Trade Association

Networks are an opportunity to increase membership by offering strategic services that build members' competitive advantage.

In Rhode Island, the head of the National Tooling and Machining Association chapter organized a network and obtained a state grant to cover the costs of a badly needed apprenticeship program.

State or Local Economic Development Official

Networks permit efficient delivery of services to groups of firms

Networks are an effective mechanism for stimulating demand for the financing, marketing, export, and other business assistance programs you provide—and networks permit efficient delivery of services to groups of firms.

The State of New Jersey leverages its budgets by organizing firms around sectoral service centers for efficient service delivery.

University or Community College Administrator

Networks organize small firms into groups and make it easier for you to respond to their research and training needs.

Camden County College in New Jersey uses networks to assist the transformation of minority-owned manufacturing firms into high-performance workplaces.

Private business consultant

Because networks enable small firms to share the cost of services, they help you broaden your client base and increase your profits.

Quality consultants in Michigan, marketing consultants in Wisconsin, and environmental consultants in New Jersey are using networks to turn small firms into customers for sophisticated and expensive professional services.

BROKER COMPENSATION

Network brokers are drawn from trade associations and economic development agencies, from community colleges and technology extension services. Many, however, are private consultants. For them, the issue of compensation is critical.

Manufacturing networks are intended to be profit-oriented, collective business ventures. Requiring fair broker compensation from the outset helps good networks grow on a solid foundation. In Europe, even public sector network efforts charge for services—often starting with low fees and raising them as networks demonstrate their results in increased profits. Given strong business plans and financially sound member firms, a number of avenues should be open to finance network development and support fees for U.S. brokers:

- Network firms should be willing to invest in new lines of business and in services that directly increase productivity.
- Royalty and percentage of sales agreements are often used to compensate brokers and specialist consultants.
- A number of states have created challenge grant programs to provide seed funding for networks.
- Foundations and public utilities might contribute to the creation of networks if their goals include retaining and creating manufacturing jobs.

CHARACTERISTICS OF SUCCESSFUL BROKERS

Effective network brokers, wherever they are found, have similar characteristics:

- Brokers are committed. They accept the fact that business culture change is a slow process. They are aware of what will happen if firms fail to modernize. And they are ready to stay the course.
- Brokers are entrepreneurial. That is, they see new ways of adding value by combining the capabilities of complimentary firms with those of research, training, marketing, and other organizations.
- Brokers are knowledgeable. They understand their target companies and the environment in which they do business.

For that reason, it makes sense to begin planning your work as a network broker by reviewing your own industry knowledge, entrepreneurial skills, and commitment to manufacturing competitiveness—and making a plan to develop the additional skills you will need to be an effective manufacturing network broker.

A REMINDER: SIX STEPS TO SUCCESSFUL MANUFACTURING NETWORKS

These six, sequential tasks define the mission of the network broker.

Step 1: Broker skills. Network brokers make a commitment to learning network strategies and organizing skills.

Step 2: Target firms and sectors. Brokers target key industries for network development and get to know these industries well.

Step 3: Hold focus groups. Brokers identify target firms, and their common problems and opportunities.

Step 4: Access resources. Brokers identify public and private sector resources networks need.

Step 5: Launch pilot network projects. Brokers demonstrate the value of cooperation through successful network projects.

Step 6: Build network culture. Brokers help networks expand, fostering a permanent industry culture of cooperation and competitiveness.

BROKER PERSONAL DATA

NAME OF BROKER ____

1. **WHAT INDUSTRY SECTOR(S) DO YOU KNOW BEST?**

____

2. **RELEVANT WORK EXPERIENCE**

____

____

____

____

____

____

____

3. **CHECK THE BUSINESS AREAS WITH WHICH YOU ARE FAMILIAR:**

____ Market Research
____ Engineering Design
____ Strategic Planning
____ Marketing
____ Production Engineering
____ Training
____ Cost Accounting
____ Plant Layout
____ Purchasing

Other: ____

____

____

____

____

____

4. KNOWLEDGE & SKILLS

Please rate yourself on each item:

	HIGH	MODERATE	LOW
A. Familiarity with manufacturers and their problems in your region.			
B. Entrepreneurialism: ability to spot new business opportunities.			
C. Knowledge of public sector and higher education services available to manufacturing industry.			
D. Group process: negotiating skills, conflict resolution, group management.			
E. Competence to conduct manufacturing company assessments.			
F. Familiarity with cost justification analysis, and similar financial techniques.			
G. Experience with strategic planning and strategic marketing planning.			

5. PLANS TO INCREASE SKILLS AND KNOWLEDGE

Courses and seminars:

Books to read:

Other:

6. TIME AVAILABILITY & COMMITMENT

A. How much time will you be able to give to network project development in an average week?

B. Why do you want to become a network broker?

7. PERSONAL NETWORK GOALS

8. IN WHICH INDUSTRIAL SECTORS AND ON WHAT KINDS OF NETWORK PROJECTS DO YOU PLAN TO BEGIN?

9. WHAT ARE YOUR KEY CONTACTS IN EACH SECTOR?

THE METALWORKING CONNECTION, INC.

Bob Graham runs the Defense Procurement Center at Southern Arkansas University in Magnolia. Clayton Franklin manages the business assistance program at Henderson State College in Arkadelphia. Both have long records of service to the metalworking industry in the southern part of the state.

When they heard about flexible networks in 1990, they saw a way to leverage their resources and increase their impact on local firms and the regional economy. To get an understanding of the problems affecting firms in the area, they developed a straightforward mail survey. Then Graham and Franklin used the survey responses to plan the agenda for the first meeting.

The survey conducted by Bob Graham and Clayton Franklin showed, in order of importance, that local companies were very interested in participating in a "metalworking society," wanted help with insurance purchasing, and were looking for product development and sales assistance. When the first network project—group insurance—saved the participating companies nearly $1 million, the success of the Metalworking Connection was assured. Today, the organization has been incorporated under an industry Board. The Metalworking Connection, Inc. manages a variety of projects including joint bidding, materials procurement, apprenticeships, and work force training.

What are the lessons? When possible, deal with firms that know you. Know the needs of firms you work with. Discuss networks as solutions to the problems they know they face. Achieve early successes. Always keep you eye on the network—which is greater than the sum of the individual firms.

Survey forms like the ones used by brokers Graham and Franklin are included in Section Two of the Handbook. Use them to identify network potential in your region.

COMMON NETWORK MODELS

There are two basic types of manufacturing networks:

Production networks: In vertical networks, firms combine complementary capabilities to carry out value-added manufacturing operations. The appropriate number and type of firms depends on the nature of the production jobs the network aims to bid on and the skills of individual members. Product liability, common quality standards, and the need for coordination are basic issues for production networks.

Service networks: These are often horizontal networks in which same-sector firms share the management tasks and cost of solving common problems such as marketing and work force development. Some service networks are very large, involving dozens or even hundreds of companies. Service networks focus on pre-competitive projects, delivering useful services and building trust relationships in industry.

Networks as Organizations. Many successful networks are based on nothing more than a verbal agreement and a handshake. Where patents or licenses are to be shared, however, networks are often set up as joint venture companies owned by partner firms. For joint bidding or shared equipment use, an exchange of letters of agreement among network members is usually adequate. Some larger purchasing and work force training networks have been organized as permanent nonprofit corporations. A general rule is to start simply, but consult an attorney whenever the size of the network's risk, assets, or tax exposure makes protection important.

Here are some frequently encountered network functions:

NETWORK FUNCTIONS	LIST LOCAL FIRMS OR INDUSTRIES THAT SHOULD BE INTERESTED IN EACH NETWORK FUNCTION
Work force training	
Quality improvement	
Manufacturing technology: • Technology development • Shared use of advanced equipment	
Product development	
Procurement	
Joint production	
Market Development	
Exporting	
Add your ideas:	

NETWORK DESIGN EXERCISE

The project design exercise that follows simulates the work of a network broker. Bring all of your business experience to bear as you use Handbook data describing the precision machining industry in an important manufacturing region to plan a network development strategy.

NETWORKS FOR THE PRECISION MACHINING/ TOOL & DIE INDUSTRY

Here is an opportunity to analyze a key manufacturing sector and propose network strategies to rebuild its competitiveness. As you read the industry description below, consider the following questions:

1. **What is the structure of the industry described below?**
   Small firms vs big firms
   Product manufacturers vs contract manufacturers (job shops)
   Markets served
   Geographic concentrations
   Which subsectors are most important?

2. **What special problems do small (20-100 employees) firms face?**

3. **What is the competitive situation of the industry and its subsectors?**
   Weaknesses
   Strengths
   What are the major obstacles to increasing market share?
   What are the critical success factors for firms in this industry?

4. **What *network strategy* should the sector (or subsector) adopt to achieve sustainable competitive advantage?**

5. **What resources are available—from both the public and private sectors in your state—to support this strategy?**

Read the industry description, then use the worksheet provided to design network projects. As a network broker, how do you propose to get sector firms involved in networks to increase competitiveness?

A REGIONAL PRECISION MACHINING-TOOL & DIE INDUSTRY

The precision machining-tool & die sector (including SIC 3544 and parts of SIC 3545, 3541, 3542) in a Great Lakes state and its region counts **662 establishments**, employing 16,000 workers. The size distribution of firms is as follows:

1-4	150
5-9	155
10-19	170
20-49	130
50-99	35
100-249	20
250-499	2
500+	0

Median firm size is approximately 13 employees. Seven of 44 counties in the state show concentrations of 40 or more establishments. The state contains 2.5 percent of all U.S. tool & die shops. Another 8 percent are found in the five contiguous states.

Process technologies include design, welding, finishing, turning, drilling, milling, tapping, electrical discharge machining, grinding, boring, gear cutting, and assembly.

Technology status is average for the United States. A recent survey shows the percent of firms using each of the following:

CNC equipment	64%
NC machine tools	40%
CAD	42%
PLCs	26%
SPC	23%
Automated inspection	11%
Robots	0%
MRP/MRPII	28%

Products:

32%	Precision machined parts
10%	Special machines
10%	Dies
12%	Molds for plastics fabrication
8%	Jigs, fixtures, gages
6%	Other molds

Approximately 40 percent of all products are exported out of state. Five percent are shipped overseas.

Competition comes principally from other Great Lakes States. There is increasing penetration of this market from Canada, Italy, Spain, and Taiwan.

Key industry challenges as identified in a recent survey:

- Scarcity of skilled workers to replace aging work force.
- Growing cost of quality machine tools.
- Price pressure resulting from too many firms going after too little work.
- Banks do not understand industry or the technologies it must adopt, hence are loath to lend.
- Difficulty in adopting new technologies with existing work force, especially CAD/CAM.
- American OEM loss of market share—especially in automobiles—necessitates diversification into new fields.
- OEM pressure to provide on-line CAD, engineering support, JIT delivery, and other expensive services.

NETWORK DESIGN EXERCISE WORKSHEET

Use this form to plan precision machining industry networks.

Key Competitive Issues:	
Number of Firms Affected by Each Issue: Network Strategy:*	
Resources Available to Help:	
Brokers' Organizing Approach: If this were a real network situation, how would you decide which companies to approach first? How would you get them to the table to discuss network solutions to their competitiveness problems?	

* There are basically only two business strategies open to small firms: low cost and "differentiation." Competing on cost alone can be tough on wages and profits, making it hard to keep up with new technologies. Differentiation—meaning better quality and higher levels of service—can be the key to business success. How can networks make differentiation strategies possible?

The next step is to propose some initial networks for real firms.

A FIRST NETWORK PLAN

American firms are already joining networks to reduce costs, access advanced technologies, create products and services, and enter new markets—working together to compete in the global economy. The following guide will help you think about the specific types of manufacturing networks your local industries need most. Here is a partial list of possibilities:

Production Networks
What network projects would you add?

- PROCESS TECHNOLOGY
  - *process design R&D*
  - *shared manufacturing equipment*
- WORK FORCE SKILL
  - *work force training*
  - *shared engineers*
- QUALITY ASSURANCE
  - *quality control/assurance systems*

Management Networks

- QUALITY MANAGEMENT
  - *TQM or ISO 9000 user groups*
- BUSINESS PLANNING
  - *strategic planning*
- SUPPLIER DEVELOPMENT
  - *group procurement*
  - *supplier certification*
- SCHEDULING, INVENTORY CONTROL, JIT
  - *electronic links to customers and suppliers*

Marketing Networks

- PRODUCT DEVELOPMENT
  - *product commercialization*
  - *product licenses for joint production*
- STRATEGIC MARKETING PLANNING
  - *collective market research*
  - *vertically integrated supplier networks*
  - *export networks*

What network project ideas would you add to this list?

Use the Network Planning Forms on the following pages to set priorities for your work as a broker. Start with the industry sectors you know best.

INDUSTRY SECTOR______________________________ # FIRMS____________

LOCATION____

1. INDUSTRY PROFILE

TYPICAL COMPANY MISSION

TYPICAL BUSINESS GOALS	OBSTACLES TO REACHING BUSINESS GOALS
Sales volume growth: New products launched: New markets entered: Other: ____________________: ____________________:	Cash? Expertise? Time? Need for network partners?

BUSINESS SYSTEM OF THE FIRM

Where does the industry you selected fit in its 'business system'? What kinds of companies supply it? Who are its customers? Indicate key suppliers and buyers in the production chain leading to final customers for goods/services.

Raw
Materials>________________>________________>________________>________________>________________> Customers

Firms adding value

Where do networks make sense?

2. A QUICK ASSESSMENT OF MANUFACTURING BUSINESS FUNCTIONS

How does the local industry you selected rank against its competitors in each of the functional areas listed below?
Rate each function 1 = world class, 2 = acceptable, 3 = needs help badly.

FUNCTION	**RATING**	**PROBLEM RANKING***	**GOALS FOR IMPROVEMENT**
PRODUCTION			
PROCESS TECHNOLOGY	______	______	____________________
HUMAN RESOURCES	______	______	____________________
QUALITY ASSURANCE	______	______	____________________
MANAGEMENT			
QUALITY MANAGEMENT	______	______	____________________
BUSINESS PLANNING	______	______	____________________
SUPPLIER RELATIONS	______	______	____________________
SCHEDULING, INVENTORY CONTROL, JIT	______	______	____________________
MARKETING			
STRATEGIC MARKETING	______	______	____________________
SELLING TO OEM	______	______	____________________
PRODUCT DEVELOPMENT SUPPORT	______	______	____________________
OTHER ______________	______	______	____________________

*Rank each problem from 1 to 11 (1 is the target industry's most serious problem).

3. OVERCOMING OBSTACLES TO INDUSTRY GROWTH WITH MANUFACTURING NETWORKS

FUNCTION	PROBLEM RANKING	NETWORK EXAMPLES	PRIORITY*
A. PRODUCTION			
PROCESS TECHNOLOGY	________	Share purchase and use of expensive manufacturing equipment	________
		Create more efficient process technologies through joint R&D	________
HUMAN RESOURCES	________	Share the cost of an engineer for plant or product redesign.	________
		Form a consortium to manage a large-scale worker training project through OEDD's work force development division.	________
QUALITY ASSURANCE	________	Work with other firms to improve quality	________
		Set up a common quality testing laboratory for a group of firms	________

Add your own production network ideas:

	________	______________________________	________
	________	______________________________	________

* Use your understanding of industry needs to rank the importance of network concepts: Very High, High, Medium, Low.

3. OVERCOMING OBSTACLES TO INDUSTRY GROWTH WITH MANUFACTURING NETWORKS

FUNCTION	PROBLEM RANKING	NETWORK EXAMPLES	PRIORITY*
B. MANAGEMENT			
QUALITY MANAGEMENT	______	Hire a TQM or ISO 9000 facilitator to achieve customer certification for a group of firms	______
BUSINESS PLANNING	______	Learn about competitors' strategies and market opportunities by setting up a multi-firm strategic planning program	______
SUPPLIER RELATIONS	______	Organize group purchasing for quantity discounts from suppliers	______
SCHEDULING, INVENTORY CONTROL, JIT	______	Create an Electronic Data Interchange system to link small firms, suppliers, and customers.	______
		Form an MRPII planning and implementation partnership; share the cost of software and consultants	______
Add additional management network ideas:			
	______	______	______
	______	______	______

3. OVERCOMING OBSTACLES TO INDUSTRY GROWTH WITH MANUFACTURING NETWORKS

FUNCTION	PROBLEM RANKING	NETWORK EXAMPLES	PRIORITY*
C. MARKETING			
STRATEGIC MARKETING	________		
		Share cost of market research—then enter new markets	________
		Prepare a marketing plan and test-market related products produced by a group of firms	________
SELLING TO OEM	________		
		Organize cooperation around production, logistics, and engineering design firms, creating a vertically-integrated network to supply major OEM corporations	________
PRODUCT DEVELOPMENT	________		
		Pool company skills to design and manufacture a new product—hire a design consultant to help	________
		Pool dollars to purchase product licenses for rapid product launch	________
		Share engineering costs to support customers' goals for innovation and cost reduction	
Add additional management network ideas:			
	________	________________________	________
	________	________________________	________

A FIRST NETWORK PLAN

Now that you have a made choices regarding a target industry sector, industry problem priorities, and potential network projects, you are ready to propose your first manufacturing network project. Use the following form to:

1. Describe several manufacturing companies you know well in the industry sector you have targeted.
2. List their most important products and markets.
3. Rank the competitive challenges the firms face.
4. Describe the cooperative network projects that would help most.

FIRMS	
PRODUCT-MARKETS	
CHALLENGES	
NETWORK IDEAS	

List what you will need to start these networks:

- Resources ______________________________

- Information ______________________________

- Other help ______________________________

____

____

____

____

Networks and Electronic Communication

What is the largest geographic area over which a network can operate effectively? How important is face-to-face contact? These are questions with which brokers must grapple frequently.

We know that Fortune 500 companies manage global networks and global production systems. But small firms lack the managerial depth and travel budgets this requires. In some small manufacturing networks, the cost of transporting goods may limit participation to firms in a single industrial park. For small firm owners, time is always a constraint. How far networks members are willing to travel to meetings depends on their calculations of benefits and costs. While circumstances vary widely, a good rule-of-thumb is that an hour's drive is as much as network members can be expected to do on a regular basis.

An alternative worth exploring is a good electronic communications system. A computer bulletin board listing meeting dates, offers to buy or sell excess inventory and equipment, and bidding opportunities is a good way to start. The next step is to interactive electronic mail, requiring nothing more than a PC with an inexpensive modem and communications software in each network member's shop. A later step might be to Electronic Data Interchange (EDI), with its capabilities to manage CAD files, purchase orders, and invoices.

The advantages of computer links between firms and their brokers include:

- Communication is asynchronous—messages can be received and stored and replies sent at any time of the day or night. There is no need to be available to talk on the phone.

- Computer conference systems can be tied into subscriber data bases, allowing network members to share and discuss information about markets and technologies.

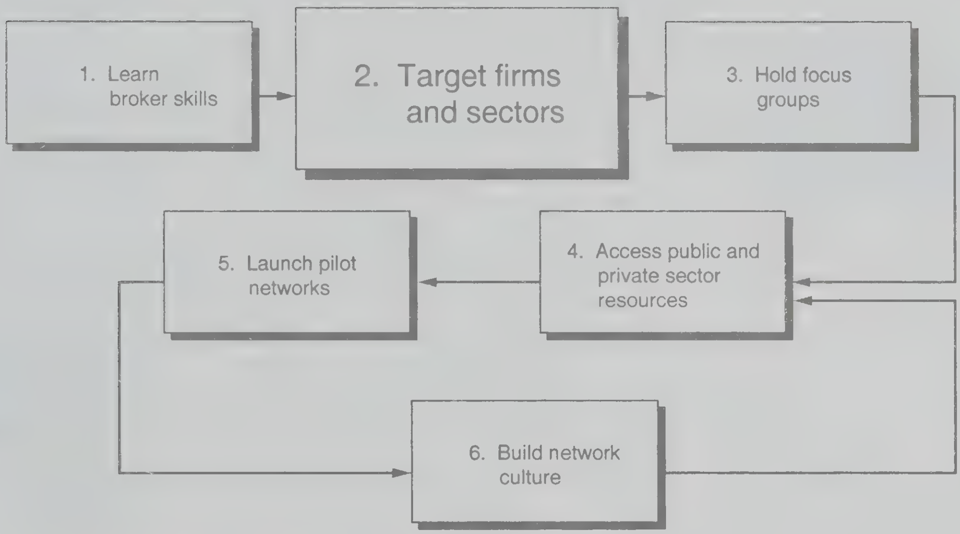
- Private subconferences can be easily arranged, permitting firms to coordinate small group projects and maintain confidentiality.

- Growing hardware and software affordability makes it possible to extend simple electronics communication links into EDI, putting networks on line with their customers.

Many community colleges and local economic development agencies already manage computer conferencing systems. Talk with them about using their host computers to serve local networks.

SECTION TWO:

TARGETING SECTORS AND FIRMS FOR MANUFACTURING NETWORKS



WHAT YOU WILL FIND IN THIS SECTION:

- **GUIDELINES FOR TARGETING INDUSTRY SECTORS AND FIRMS.**
- **WHERE TO FIND DATA ON LOCAL INDUSTRY.**
- **KEY INDUSTRY ASSESSMENT FORMS TO IDENTIFY NETWORK POTENTIAL.**
- **INDUSTRY DATA WORKSHEETS.**
- **SECTOR NEEDS SURVEY FORMS AND AN INDIVIDUAL COMPANY INTERVIEW QUESTIONNAIRE.**

TARGETING SECTORS AND FIRMS FOR MANUFACTURING NETWORKS

An important first task for every broker is investigating local industries in order to target those with serious network potential

A glance at the Yellow Pages or a Manufacturers Directory will show that most states and regions contain a large number of different industry sectors. Not all are of equal importance. Some sectors have many firms, others very few. Some work at the cutting edge of technology, while others struggle to keep up with their competitors. A few sectors may be dominated by a handful of giant companies, while others are comprised of large numbers of small enterprises. Some sectors appear in isolation. Others form distinct clusters made up of interdependent groups of buyers and suppliers. An important first task for every broker is investigating local industries in order to target those in which networks can make a real difference to competitiveness.

Firms looking to diversify their products or markets—for example, because of defense cutbacks—are better targets than firms with full order books and a secure niche

Industries vary in their size, structure, and competitiveness. Companies also exhibit a range of differences that effect receptivity to network strategies. Vertically-integrated manufacturers are rarer today than in the past, but some still exist. They have less need for partners than more specialized firms. Branch plants under the control of a distant home office are often disinclined to get involved in network projects. Head-to-head competitors will probably refuse to cooperate in the early going. Firms looking to diversify their products or markets—for example, because of defense cutbacks—are better targets than firms with full order books and a secure niche. It is the broker's job to find the firms, as well as the industries, that have the greatest network potential.

Identifying Customer Needs

Here is a three-step process for understanding the needs of firms in the sectors you have targeted:

1. Start with library research on conditions in the market, best management practices, manufacturing innovations, strategies of foreign competitors, and other strategic factors. Discuss what you learn with sector representatives, vendors, and customers.

2. Visit plants. Both "benchmark" and typical firms should be identified and site visits carried out to develop industry contacts, learn about conditions first hand, and identify critical success factors. In-depth interviews should be conducted to explore perceived challenges and their implications for network receptivity.

3. Mail surveys—often best conducted jointly with trade associations—help to quantify and prioritize needs. Do this last, as a step toward bringing firms together for network discussions.

The Standard Industrial Classification System

The Standard Industrial Classification (SIC) Manual is widely used in economic development circles to describe manufacturing sectors. It is available from National Technical Information Center; 5285 Port Royal Rd. Springfield, Virginia, 22161 order no. PB 87-100021.

The Standard Industrial Classification System

The SIC manual describes manufacturing establishments at three levels of detail
as shown by the following examples.

2-digit industry group		3-digit Example		4-digit Example	
20	Food and kindred products	207	Fats and oils	2077	Animal and marine fats and oils
21	Tobacco products	212	Cigars	2121	Cigars
22	Textile mill products	228	Yard and thread mills	2281	Yarn spinning mills
23	Apparel and other finished products made from fabrics and similar materials	238	Miscellaneous apparel and accessories	2387	Apparel belts
24	Lumbar and wood products, except furniture	244	Wood containers	2448	Wood pallets and skids
25	Furniture and fixtures	251	Household furniture	2515	Mattresses, foundations, convertible beds
26	Paper and allied products	265	Paperboard containers	2656	Sanitary food containers, except folding
27	Printing, Publishing, and allied industries	277	Greeting cards	2771	Greeting cards
28	Chemicals and allied products	283	Drugs	2835	In vitro and In vivo Diagnostic sub stances
29	Petroleum refining and related industries	295	Asphalt paving and roofing materials	2952	Asphalt felts and coatings
30	Rubber and miscellaneous plastics products	308	Miscellaneous plastics	3082	Unsupported plastics profile shapes products
31	Leather and leather products	314	Footwear, except rubber	3142	House slippers
32	Stone, clay, glass, and concrete products	326	Pottery and related products	3264	Porcelain electrical supplies
33	Primary metal industries	332	Iron and steel foundries	3324	Steel investment foundries
34	Fabricated metal products, except machinery and transportation equipment	346	Metal forgings and stampings	3466	Crowns and closures
35	Industrial and commercial machinery and computer equipment	357	Computer and office equipment	3572	Computer storage devices
36	Electronic and other electrical equipment and components except computer equipment	363	Household appliances	3635	Household vacuum cleaners
37	Transportation equipment	372	Aircraft and parts	3724	Aircraft engines and engine parts
38	Measuring, analyzing, and controlling instruments; photographic medical and optical goods; watches and clocks	385	Ophthalmic goods	3851	Ophthalmic goods
39	Miscellaneous manufacturing industries	395	Pens, pencils, and other artist's materials	3955	Carbon paper and inked ribbon

Finding the point where industry receptivity, network potential, and your abilities intersect is a key step to success as a network broker

Careful targeting is essential. Finding the point where industry receptivity, network potential, and your abilities intersect is a key step to success as a network broker.

To ensure maximum impact, you will want to use published data on firm location, products, employment, and wages, and business condition reports issued by industry associations to target sectors and firms. You may also need to conduct mail surveys and in-plant interviews to uncover the common needs and opportunities around which networks are built. Sample survey forms and an interview questionnaire to help you with these tasks are included in this Section.

Critical Sector Screens. The Research Guide found in this section will lead you to information on manufacturing industry in your region. Selecting appropriate targets, however, requires clear goals. When the State of New Jersey set out to target network potential, all SIC manufacturing industries were systematically evaluated. The following criteria were used to identify those industries in which network building would have the greatest impact:

1. *Traded-sector status.* Industries that are exposed to national and international competition and that directly or indirectly ship products out of state get priority. Sectors that are oriented primarily to the local market, e.g., HVAC sheet metal suppliers, most printers, and neighborhood bakeries, were excluded from the network program.

2. *Importance of small firms in each industry.* On this measure, apparel contracting, plastics molding, and metalworking stand out as primary targets. The chemical and telecommunications industries (despite their importance in New Jersey) are dominated by a few multinational corporations and hence do not qualify as targets.

3. *Evidence of social and commercial ties.* Because the network approach stresses consortial projects and inter-firm cooperation, the level of industry organization becomes a critical factor. One useful measure is the size and sophistication of trade associations.

Employment levels, growth rates, and job quality are important factors

4. *Direct economic importance.* Growing employment levels and high wages are key economic goals. Employment levels, growth rates, and job quality are important factors.

5. *Interdependence.* Firms with many local buyer-supplier links are always worth a close look. Even in an era of global sourcing, tight supplier linkages that support OEM goals of continuous product improvement, or reduced

inventory costs, or shorter time to market remain important. Good brokers seek opportunities to strengthen cluster ties—to the benefit of both the large and small firms within them.

You will want to meet with trade associations, business organizations, and labor unions to understand target industry issues as industry sees them

Once you have carefully evaluated the industries in your area, it is time to engage each targeted sector directly. You will want to meet with trade associations, business organizations, and labor unions to understand target industry issues as industry sees them. As elsewhere in the contemporary business world, the quality of a network broker's services depends on a thorough understanding of customer needs.

Research is needed to answer the fundamental manufacturing question: who does what, where, with what, for whom, how well?

DATA FOR INDUSTRY RESEARCH

If brokers are to help small firms achieve sustainable competitive advantage through network cooperation, deep knowledge of their strengths and weaknesses and of factors driving competition will be needed. Research is needed to answer the fundamental manufacturing question: *who does what, where, with what, for whom, and how well?*

The following is a brief guide to researching the manufacturing endowment of your region. The information sources listed can be invaluable in selecting target sectors, understanding needs, and planning network projects.

As you become more deeply involved in industry projects, you may find that published data is an insufficient guide. At the end of this section, you will find sample survey instruments you can use to learning about specific industry sectors and companies with which you plan to work. But first, get to know the published information and how to use it well. You might begin by going to the telephone and ordering a copy of *County Business Patterns* for your state. This essential reference is available from:

Order and Information Desk
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402-9325
202/783-3238

INDUSTRY RESEARCH GUIDE

RESEARCH ISSUE/STEP	DATA SOURCES	DATA USES
1. Who does what, where? Describe industry sectors and spatial structure at the 4-digit Standard Industrial Classification (SIC) level. All good libraries have copies of the SIC Manual and state manufacturers directories.	Basic reference is *County Business Patterns,* published annually by U.S. Bureau of the Census for each state and its counties. Counts of establishments by size and SIC sector are included along with employment and payroll data.	Sectoral targeting; identification of significant industry clusters. Provides information on employment levels and wages—important to target selection.
	For greater detail, see manufacturers directories, Dun & Bradstreet's DMI database, or American Business Lists (Omaha, Nebraska).	Information on products and markets, names and addresses of key company contacts.
2. With what, for whom? Investigation of interindustry supplier and customer linkages.	Within target sectors, stratified sampling by interview or mailed survey. Trade publications are essential sources.	Tight linkages and substantial, wealth-producing "exports" define likely sectoral targets and potential networks.
3. How well is the industrial base doing?	Value of shipments and value added are given in the *U.S. Census of Manufactures* which appears every five years.	Design of sectoral interventions.
Investigation of competitiveness of key sectors.	Relative productivity can be estimated by comparing data across sectors on value added/employee in the latest *Census of Manufactures*.	Networks begin with collective solutions to critical industry problems.

RESEARCH ISSUE/STEP	DATA SOURCES	DATA USES
Consideration of industry's technology level.	Useful data on adoption rates for key technologies can be obtained from the U.S. Census Bureau's *Survey of Manufacturing Technology.*	Determination of network focus on technology deployment.
	Industry perceptions of competitive challenges can be determined from trade publications and trade association newsletters; better yet are surveys and focus groups organized by sector, firm size, and market served.	
Market trends and evaluation of domestic and foreign competitors' strategies.	U.S. Department of Commerce's annual *Industry Outlook* series; trade association reports. State Department of Labor industry employment projections are also useful.	Delivered to industry in sectoral strategic planning meetings, this information can be effective in creating a common vision and building a cooperative business culture.
	Trade publications.	
	Additional data sources you have found:	Uses for data in network planning:
Regional issues:		

IDENTIFYING NETWORK POTENTIAL IN TARGET SECTORS

The Target Industries Assessment Worksheet on the following page will help you rank the network potential of local industry sectors

"Network potential" means two things: likelihood of success in building networks, and probability that networks will have measurable impact on business performance and regional economic growth

With *County Business Patterns* as a basic data source, information gathered the *Census of Manufactures*, and conversations with trade associations, chambers of commerce, and industry leaders, you are in a position to rank industry sectors on network potential. The **Target Industries Assessment Worksheet** on the following page will help you rank the network potential of local industry sectors. As you will see, the ranking system is partly subjective and partly objective. Remember that 'network potential' means two things: likelihood of success in building networks, and probability that networks will have measurable impact on business performance and regional economic growth. Here is a list of factors that indicate network potential:

FIRM AND SECTOR NETWORK RECEPTIVITY
1. Companies recognize they have common problems
2. There is a tradition of cooperation
3. Firms are geographically clustered
4. Some networks already exist

FIRM AND SECTOR NEED FOR NETWORKS
5. Significant numbers of small firms (10-150 employees)
6. Scale economies are critical to cost competitiveness
7. Defense cuts, or other market shifts are serious issues
8. Collaboration is key to firms' ability to access resources
9. Import penetration is high and growing

ECONOMIC IMPORTANCE OF FIRMS AND SECTORS
Rank groups of firms by:
10. Gross exports (sales outside of region) in dollars
11. Importance as suppliers to key, regional export sectors
12. Total payroll contributions to regional economy
13. Anticipated employment growth
14. Value added per payroll dollar

Make copies of the Target Industries Assessment Worksheet and use them to poll people who know regional manufacturing well

You may wish to use make copies of the Target Industries Assessment Worksheet and use them to poll people who know regional manufacturing well. This is an opportunity to obtain additional input from knowledgeable people as you get close to making targeting choices.

Target Industries Assessment Worksheet

Assess the factors listed below for each Key Industry using the following measures: 3 = High 2 = Moderate 1 = Low 0 = Little or None

	Insert names of key industries	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Assessment Issues	Recognition of common problems										
	Tradition of cooperation										
	Geographic clustering/proximity										
	Networks exist										
	Network potential										
	Importance of economy of scale										
	Impact of collaboration on access to resources										
	Market penetration by imports										
	Gross exports										
	Linkage to key export sectors										
	Job quality										
	Anticipated growth										
	Value added per payroll $										
	Other (define):										

TARGET INDUSTRY DATA

Use this form to record key facts about the industries you have chosen to work with.

Describe your regional focus. What is the area in which you plan to organize firms? Is it a city? a county or multi-county area? an entire state?

Define Network Region: ____

Target Industry 1: ________________________________ SIC____________

Principal reason for targeting: ____

Number of establishments

Total: __________

Number with 10-150 employees: _____________

Total employment: ____________ Annual wage bill: $ __________

Products/Markets: ____

____

____

____

Comments (add key data you have gathered): ____________________________

____

____

____

Evidence of collaboration (trade associations, cooperatives, joint ventures, business roundtables, etc.):

____

____

Target Industry 2: ______________________________ SIC ________________

Principal reason for targeting: ____

Number of establishments

Total: __________

Number with 10-150 employees: ______________

Total employment: ____________ Annual wage bill: $ __________

Products/Markets: ____

____

____

____

Comments (add key data you have gathered): ___________________________________

____

____

____

____

____

Evidence of collaboration (trade associations, cooperatives, joint ventures, business roundtables, etc.):

____

____

____

____

____

____

Target Industry 3: ________________________________ SIC ______________

Principal reason for targeting:__________________________________

Number of establishments

Total: __________

Number with 10-150 employees: ______________

Total employment: ____________ Annual wage bill: $ __________

Products/Markets: ____

____

____

____

Comments (add key data you have gathered): ________________________________

____

____

____

____

____

Evidence of collaboration (trade associations, cooperatives, joint ventures, business roundtables, etc.):

____

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____

____

THE IMPORTANCE OF TRADE ASSOCIATIONS

Trade associations are essential sources of help

Trade associations that organize the industries you have targeted are essential sources of contacts, information, and organizing help. They can also be key partners in network projects. Check the Yellow Pages and your local library's reference section for trade association and business organization listings. If no local chapters are found, a call to the associations' national offices will quickly put you in touch with local members.

List association names, addresses, key contact and names of officers (or Board members), phone and fax numbers below. Note time and place of regular meetings.

SECTOR ____________________

ASSOCIATION ____________________

ADDRESS/PHONE/FAX ____________________

OFFICERS ____________________

NOTES ____________________

____

____

SECTOR ____________________

ASSOCIATION ____________________

ADDRESS/PHONE/FAX ____________________

OFFICERS ____________________

NOTES ____________________

____

____

SECTOR ________________

ASSOCIATION ________________________________

ADDRESS/PHONE/FAX __________________________

OFFICERS __________________________________

NOTES ____________________________________

SECTOR ________________

ASSOCIATION ________________________________

ADDRESS/PHONE/FAX __________________________

OFFICERS __________________________________

NOTES ____________________________________

SECTOR ________________

ASSOCIATION ________________________________

ADDRESS/PHONE/FAX __________________________

OFFICERS __________________________________

NOTES ____________________________________

SECTOR NEEDS SURVEY

The survey that follows is a good tool for identifying common interests among the small firms in your target sectors. It asks company owners or managers to rank a number of possible business services. Companies expressing similar needs are excellent targets for network organizing.

There are three ways to get a good response to a needs survey

There are three ways to get a good response to the sector needs survey:

- Do it through the mail in collaboration with a lead firm or a trade association. Duplicate the survey form onto their letterhead and cover it with a letter from a well-known member. Experience tells us that a 10-15 percent response rate is normal for a mail survey. Telephone calls and follow-up mailings will be needed to increase the yield significantly.
- Arrange for local economic development agencies, technology transfer organizations and utility company field staff to use the survey to gather information about target industry needs.
- Organize a workshop on a topic of interest to target industry firms. Team up with a community college, local economic development agency, or export promotion organization to bring firms together. Make a completed survey form the price of admission.

Make a plan to conduct the survey.

Partners:

Mailing list sources:

Workshops topics:

SECTOR NEEDS SURVEY

In completing this survey, please use the following
Interest Rating Scale: 12-High; 9-Moderately High; 6-Moderate; 3-Low; 0-None

SHARED SERVICES

Please indicate your interest in each of the following services

I. Reduction in raw material cost through consolidated purchasing Rating: ____

II. Access to Engineering Services Rating: ____

III. Analysis of Industry Market Trends Rating: ____

IV. Training in use of Technology:

(1) Computer Aided Design Rating: ____

(2) Computer Integrated Manufacturing Rating: ____

(3) Other (Define) Rating: ___

(4) Other (Define) Rating: ___

(5) Other (Define) Rating: ___

V. Product Development: Rating: ___

Service components might include design, value engineering, prototype development, market assessment, make/buy evaluations, pricing strategies, distribution methods, and sales.

VI. Other work force training programs Rating: ____
Please note training needs.

VII. Joint Bid Proposals and Contract Management Rating: ____

SHARED SERVICE CATEGORIES (Cont'd.):

VIII. Calibration of Production Equipment and Testing Instrumentation Rating: ____

IX. Total Quality Management Training Rating: ____

X. Consolidated Employee Health Purchasing Rating: ___

XI. Workman's Compensation Administration Rating: ____

XII. Consolidated Product Liability Insurance Purchasing Rating: ____

XIII. Sales & Marketing Rating ____

Services might include:

(1) Collective advertising Rating ____

(2) Direct solicitation among potential buyers, obtaining drawings, specifications, production quantities, and delivery schedule; Rating ____

(3) Assessing process requirements to determine the member, members, or combination of members who possess capability to respond to RFQs; Rating ____

(4) Obtaining alternative raw material and component sources and pricing; Rating ____

(5) Determining traffic rates, shipping costs, and transportation lead time based on delivery schedule; Rating ____

Interest Rating Scale: 12-High; 9-Moderately High; 6-Moderate; 3-Low; 0-None

SHARED SERVICE CATEGORIES (Cont'd.):

XIV. Finance:

(1) Formation of venture corporation for equity investments Rating: ____

(2) Formation of loan guarantee cooperative for working capital Rating: ____

NON-SHARED SERVICES

I. Audit of Company Operations Rating: ____

II. Finance: Rating: ____

(1) Long-Term planning Rating: ____
(2) Plant and Equipment Loan Packaging Rating: ____
(3) Receivables Financing through Factoring Rating: ____
(4) Letters of Credit for Extended Payment Terms on Material Purchases Rating: ____

III. Financial Management:

(1) Management Accounting: Rating: ____
a. Manual System Rating: ____
b. Computerized System Rating: ____

(2) Management Accounting Features:
a. Time sheet management
b. Payroll Rating: ____
c. General ledger Rating: ____
d. Accounts receivable Rating: ____
e. Accounts payable Rating: ____

Interest Rating Scale: 12-High; 9-Moderately High; 6-Moderate; 3-Low; 0-None

(2) Management Information Systems (cont'd.):

f. Bill of materials/cost estimating Rating: ____

g. Order entry Rating: ____

h. Purchasing Rating: ____

i. Material requirements planning Rating: ____

j. Inventory control Rating: ____

PARTICIPATION

I. Interest in participation in planning needed industry services Rating: ____

II. Interest in working with partner firms to solve common problems and grow your business Rating: ____

COMMENTS:

Name of Company Represented: ______________________________

Name of Representative: ______________________________

Address: ______________________________

Telephone: ____________________ FAX: ______________

Interest Rating Scale: 12-High; 9-Moderately High; 6-Moderate; 3-Low; 0-None

SECTOR NEEDS SURVEY SUMMARY WORKSHEET

Here is worksheet for summarizing the results of the Sector Needs Survey. Begin your summary by assigning a number to each firm that completes the survey.

Enter the total number of firms that completed surveys: _________

List services frequently mentioned	Average rating	Number of firms giving highest ranking	Interested firms (give numbers)	Final Ranking of services

Participation: average rating _________

Interested firms to be contacted first ____

INTERVIEWING TARGET FIRMS

The following pages contain a *sample industry interview questionnaire.* With your modifications, it can be made to fit the special circumstances of the industries you have targeted.

Direct interviews with firm owners and managers is the best way to understand what is really going on in local industry

Although time consuming, direct interviews with firm owners and managers are the best way to understand what is really going on in local industry. By now you know that to think seriously about network competitiveness strategies, you need to know a lot about individual firms, e.g.:

- What they make
- How they make it
- How well they make it
- What they make it with
- For whom they make it
- What problems they face trying to make it

Interviews in local factories will allow you to answer key network questions

Doing interviews in local factories will also allow you to address several key network questions:

What business problems could be solved if firms were to share costs and management burdens with partners in a manufacturing network?

What new markets could firms enter by working cooperatively?

What new products could be made by linking the skills of different firms?

Here are several points to consider as you plan your local industry interviews:

1. Allow adequate time. Each interview will take an hour or more—especially if you use each interview to introduce network ideas.

2. Plan carefully. Start with the most important firms in the most important target industry. Ask trade associations, economic development staff, technology extension specialists and others to identify the five to ten leading small firms in each industry.

3. Explain the purpose of your study. Send a letter describing the advantages of network collaboration. Make clear that in-depth information is needed to plan projects that will benefit firms. Promise each firm interviewed a copy of your research results.

Don't limit your visits to the factory manager's office

4. Learn by observation. Don't limit your visit to the factory manager's office. Much can be learned by checking plant housekeeping, age of equipment, work-in-process inventory, quality control, and worker attitudes.

Brokers turn obstacles to industry growth into network solutions

5. Tailor the questionnaire to fit. Your industry research will enable you to modify the sample questionnaire to suit your target industries. Key survey questions to focus on are those regarding technology utilization, work force training needs, supplier and customer links, and perceived obstacles to growth. It is your job to turn perceived obstacles into effective network projects.

List Companies To Interview

A SAMPLE INDUSTRY QUESTIONNAIRE

Modify to suit conditions in your target industries, duplicate, and begin interviewing!

Date ________________ Interviewer ____________________________

4-D SIC code____________ **Firm Name** ___________________________

# Employees ____________ Location ______________________________

Contact__________________ Telephone/fax __________________________

1. **FIRM DATA**

1.1 Age: _________ 1.2 Years at location: _________

Other locations? ____________________________________

1.3 Ownership form (partnership, corporation, etc.)

1.4 Annual Sales for Last Three Years:

1.5 Business Organization Memberships:

1.6 Narrative history of firm 1988- (relocations/employment levels/key technological changes/discontinued product lines, etc.)

(Use a separate sheet of paper if necessary)

2. PRODUCTION IN THE FIRM

2.1 List major products

____

____

______________________________________ etc.

2.2 Which steps in the cycle of production are done here: (Rank in order of importance)

____

____

____

____

2.3 What other manufacturing activities go on here?

____

____

____

2.4 What % of production is shipped to

OEMs __________ Describe ______________________________

Wholesalers _______ Describe ______________________________

Retailers _________ Describe ______________________________

Direct sale _______

Other small firms (subcontracts) ______________________________

2.5 Subcontracting

Do you subcontract work to other firms? How much, how often?

How do you select the firms you subcontract to?

Where are most of your subcontractors located?

2.6 Do you plan to expand in the next 2 years? If yes, why?

a. More capacity

b. More phases of production Which?

2.7 Which of the following do you intend to change in the next 2 years?

Equipment ________________ Space/layout _____________

Product line ________________ Location ________________

Market segment _____________ Other____________________

Quality ____________________

2.8 Do you have a formal multi-year plan for your firm? ___Yes ___No

2.9 Who are your *five most important suppliers* and what do you buy from each?

Supplier/location	Item	Estimate of annual quantity purchased

2.10 Who are your *five most important customers* and what do you ship to each?

Customer/location	Type of goods and quantity shipped

2.11 How is marketing currently handled? How many new customers will you approach this year?

Trade shows____

Representatives ______________________________________

Marketing manager in firm ________________________________

Other ____

2.12 Do you market your firm or its products outside of this country? Where? How?

____

____

____

3. CAPITAL EQUIPMENT

3.1 Please describe your newest important production machine:

Type	year	make

3.11 Reason purchased (special features):

____

____

____

3.2 Can you give me a recent equipment list (a description of all key pieces of production equipment)?

Attach company brochures or equipment lists to this questionnaire.

3.3 In terms of technology, do you consider your operation to be:

___Advanced ___Conventional ___In need of modernization

3.4 What are your most important sources of information about new technologies?

Trade publications ____________________

Trade organizations ____________________

Technology transfer institutions ____________________

Vendors/salespeople ____________________

Other: ____________________

3.5 Do you feel able to keep up in an era of rapid technological change? If not, what do you think should be done?

____

____

____

3.6 Do you use a computer for:

	Yes	No
Production planning/control	☐	☐
CAD	☐	☐
CAD/CAM	☐	☐
Inventory control	☐	☐
Bookkeeping/payroll	☐	☐
Billing/accounts payable	☐	☐
Word processing	☐	☐
Data base access	☐	☐
Communications (modem)	☐	☐
Electronic Data Interchange (EDI)	☐	☐

4. QUALITY

4.1 How are quality standards set in your industry?

____

____

____

4.2 Do you experience problems with quality control? ____________

4.3 How do you currently control quality?

Individual workers are responsible ____________

Special quality inspectors along line ____________

Final inspection ____________

Other (describe) ____________

4.4 Are you working on ISO 9000 or TQM implementation? ______

4.5 Would quality training or *quality certification programs* help you market your firm? Describe:

____

____

5. LABOR FORCE

Please describe your work force at this time.

5.1 Total work force at this location: ____________

5.2 PRODUCTION

Machine operators (type and number)

____

____

____

____

____

Maintenance/repair (type):

____

____

____

Supervisory (shop floor):

____

____

____

Other :

____

____

____

Total number of production workers__________

5.3 OFFICE WORK FORCE (numbers)

Design ___________

Marketing/Sales ___________

Production Planning ___________

Accounting ___________

Secretarial/clerical ___________

Other ___________

Office total ___________

5.4 Total employment (average) 1990 ________ 1991 ________

5.5 How many additional workers could you use in the near future? At what starting pay?

Category	Number needed	Pay rate

5.6 What forms of training are needed for your existing work force?

____

____

____

6. FINANCE

6.1 Some local firms have difficulty obtaining certain kinds of business loans. Have you had this problem? ________

6.11 Has working capital been a problem? ________
Average amount needed $________

Reason (finance inventory, clients slow pay, etc.) ______________________________________

6.12 Are loans for equipment purchases difficult to obtain? ________

Amount needed $________

6.13 What sources have you approached? what is key problem?

____

____

FINAL OPEN ENDED INTERVIEW QUESTIONS

1. What do you think are the strengths of the industry locally?

____

____

____

2. What are the key problems of your industry?

____

____

____

3. What do you think is the greatest challenge facing firms in your business?

____

____

____

4. What services—in technology selection, management consulting, financial assistance, product design, marketing—OR ANYTHING ELSE—would help to make your firm more competitive?

____

____

5. Cooperation is the key to competitiveness in a global marketplace. Are you interested in working with other firms in the area to solve common problems? Can you name some firms that might be project partners?

____

____

6. Add your own questions:

____

____

____

____

NETWORK QUESTIONS AND ANSWERS

QUESTIONS COMPANIES ASK BROKERS:

1. Who decides what firms will be members of my network?

   Companies are always in control of network membership. The first group of owners or managers who decide to form a network get to select or reject any additional firms that wish to join. The broker's job is only to suggest potential members.

2. Who decides what the network will do?

   Members do. The network companies that must do the work and take the risks are always in charge of business decisions. The broker may make proposals, but the member firms say yes or no.

3. What is the right number of firms to include in a network project?

   There right number of firms is probably the smallest number that can get the job done—whether the job is supplying a complex assembly to an OEM or sharing the cost of a marketing consultant or managing a TQM training program. Many states, by the way, have defined networks as three or more firms working together to achieve competitive advantage.

4. Do state and federal antitrust laws prohibit networks?

   Definitely not—so long as the network doesn't command a substantial share of the market or engage in price fixing. There is more on this subject in Section six of the Handbook.

QUESTIONS BROKERS ASK ABOUT FIRMS:

1. How can firms' initial fear of working with competitors be overcome?

   Stick to pre-competitive issues at first such as work force development and market identification. Make it clear that proprietary production know-how and customer lists are off limits. Bring a valuable resource—a solution to a common problem—to the first meeting with firms.

2. Do firms have to be close together to cooperate in networks?

   Big companies have strategic allies world wide. Small firms are more likely to want to do business with partners they know and see frequently. Whenever possible, build networks from firms that are just a short drive from one another.

3. Are there successful examples of networks in rural areas where there are few manufacturers?

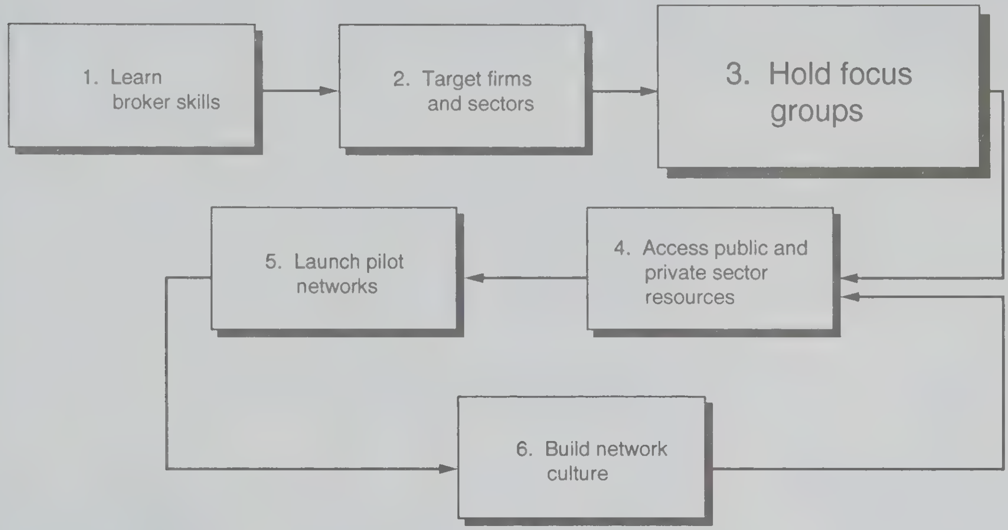
   Yes. Some of the strongest networks in the U.S. are in rural regions where manufacturers were quick to see the advantages of cooperation. Far from cities, people are accustomed to traveling to obtain the services they need. Once up and running, much network business can be managed using the telephone, fax, and computer conferencing.

4. What incentives work best to bring companies together in networks?

   The strongest motivations to join a network are increased ability to enter profitable growth markets and the possibility of realizing significant cost reductions. Successful brokers focus on new business opportunities and projects such as joint purchasing and marketing that promise quick economic returns.

SECTION THREE:

NETWORK FOCUS GROUPS



INVESTIGATING NETWORK CONCEPTS FOR THROUGH INDUSTRY FOCUS GROUPS IS THE THIRD STEP IN BUILDING MANUFACTURING NETWORKS.
THIS SECTION OF THE HANDBOOK EXPLAINS:

- HOW TO PLAN AND CONDUCT EFFECTIVE INDUSTRY FOCUS GROUPS
- HOW FOCUS GROUPS CAN BE USED TO CREATE PILOT NETWORKS
- HOW TO IDENTIFY LEAD FIRMS AND MAKE THEM YOUR PARTNERS IN NETWORK DEVELOPMENT

FOCUS GROUPS FOR NETWORKS— THEORY AND PRACTICE

A focus group is a special type of discussion group in terms of size, composition, process, and purpose. A focus group is usually made up of eight to twelve participants selected because they have common characteristics that relate to the issues for which the group is organized. Focus groups must be small enough so all can participate freely and large enough to provide a diversity of perceptions. Focus groups were originally used to test consumer response to new product concepts. In more recent years, focus groups have become a common technique for evaluating new ideas and designing effective projects.

Focus groups are a good way to investigate manufacturer's attitudes and opinions

There are two reasons to favor focus groups as a way to investigate manufacturer's attitudes and opinions. First, unlike traditional questionnaire-based surveys, focus groups are open-ended, permitting participants to shape the discussion around their own needs and interests. Second, the group setting encourages deep exploration. Good focus group leaders create an environment that encourages the free exchange of ideas, without requiring participants to plan, vote, or reach consensus. A relaxed interchange of experiences and opinions frequently leads focus groups to creative solutions.

A relaxed interchange of experiences and opinions frequently leads focus groups to creative solutions

The identification of competitiveness problems and opportunities for collaboration can be simplified significantly through the use of focus groups. In these meetings, network concepts can be comfortably examined and common strategies explored. With proper guidance, focus groups lead directly to network projects.

In sum, a focus group is a planned, thematic discussion. Topics are chosen based on analysis of the participants' backgrounds and interests and are carefully sequenced. It is best to begin by stressing factors common to focus group members before leading them to consider unfamiliar, even challenging, ideas.

Primary Themes for Network Focus Groups

Here is a list of themes for network focus group discussions:

1. Strengths and weaknesses of the target sector in the region; obstacles to growth.
2. Problems common to sector firms, e.g., technology adoption, work force skill, changes in customer requirements, etc.
3. Evaluation of existing business assistance services.
4. Ideas for new industry service programs.

5. Existing patterns of cooperation: e.g., subcontracting, trade association involvement and similar ties.
6. Responses to alternative network models.
7. Ideas for cooperative network projects.

Moderator Functions and Skills

The focus group moderator serves several purposes, gently directing the discussion, introducing new ideas, encouraging participation, listening, observing, and eventually reviewing the results to determine what has been learned and how best to proceed.

The moderator should have sound knowledge and the ability to anticipate questions that are likely to be raised

A good moderator exercises quiet control over the group, seeing to it that ideas get due consideration and that the shy are not excluded from the conversation. The moderator should have sound subject knowledge and the ability to anticipate questions that are likely to be raised.

Experienced moderators offer ideas—and let focus group participants do the evaluating

Obviously, skilled moderators do not give out rewards or punishments. Bad ideas or dead-end discussions are handled by changing the subject or breaking in to ask the most inventive participants for their opinions. Dominant talkers can usually be handled by asking, "does anyone have a different point of view?" Good ideas should be greeted with a simple "that's interesting," or a thoughtful nod of the head. Experienced moderators offer ideas—and let focus group participants do the evaluating.

GUIDELINES FOR ORGANIZING NETWORK FOCUS GROUPS

There are two approaches to networks

There are two ways for brokers to approach the formation of networks. The first, and most common, is to start by listening to "customer needs" and then access the resources that are needed to sustain a collaborative project. These networks are driven by industry need. Others may be driven by broker skills. Brokers with strong backgrounds in, for example, ISO 9000 or export marketing or engineering design may take a different tack, creating networks specifically to draw on these talents. Whatever your approach, the following guidelines will help you move quickly.

Start with companies that are known as leaders in your region

1. **Identify lead firms.** Look for companies with records of technological and management innovation. Talk with people in the target industry; note which names come up again and again as recognized (small firm) industry leaders. Ask equipment vendors who are the "early adopters" of new technologies. Check the lists of past and present officers of key trade associations.

Review your initial list with one or two industry leaders and ask for additional recommendations

2. **Select participants on the basis of similar characteristics and interests**. Mid-sized firms and small firms don't mix well. Neither do companies that are fierce head-to-head competitors. Review your initial list with one or two lead firms and ask for recommendations.

3. **Use lead firms to get others to attend**. If possible, co-sign invitations with one or more well-known industry names. Stress potential benefits of network ideas in your invitations to firms.

Stress economic benefits of networks in your invitations to firms

4. **Bring eight to twelve participants together.** Firm owners and managers have somewhat unpredictable schedules. It may be necessary to invite twelve or more in order to meet participation targets.

5. **Follow up initial invitations.** If possible, have firm owners who have agreed to participate make the necessary follow-up telephone calls.

6. **Schedule meetings at convenient times.** Early morning works for some. Late afternoon is often best.

7. **Know your audience.** Research the firms you invite to focus groups. Learn what you can about their products and their customers.

8. **Create a good presentation**. Based on what you learn, tailor the focus group forms and presentation materials found in this section of the Handbook to the needs and interests of the invited manufacturing company owners and managers.

Ideas for Focus Groups

FOCUS GROUP PLANNING FORM

FIRMS	REFERRED BY	# EMPLOYEES	PRODUCTS	COMMENTS
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				

FOCUS GROUP PLANNING FORM

FIRMS	REFERRED BY	# EMPLOYEES	PRODUCTS	COMMENTS
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				
Name ____________ Address ____________ Phone/fax ____________ Contact ____________				

FOCUS GROUP PLANNING FORM

FIRMS	REFERRED BY	# EMPLOYEES	PRODUCTS	COMMENTS
Name ____ Address ____ Phone/fax ____ Contact ____				
Name ____ Address ____ Phone/fax ____ Contact ____				
Name ____ Address ____ Phone/fax ____ Contact ____				
Name ____ Address ____ Phone/fax ____ Contact ____				
Name ____ Address ____ Phone/fax ____ Contact ____				

BRAINSTORMING NETWORKS

A network broker in Hagerstown, Maryland used the following brainstorming exercise to get firm owners to explore network ideas.

Pass out 3x5 cards. Ask each participant to write a sentence or two on each of the following topics:

- A problem affecting your company's competitiveness.
- How could a group effort help?
- Do you think many firms here have the same problem?

Give them four or five minutes to think and write. Ask volunteers to read responses. Encourage group discussion.

FOCUS GROUP MEETING MANAGEMENT

Participants should be arranged around a table so they can see one another and the focus group leader

1. The room chosen for the focus groups should be comfortable and free of distractions. Participants should be arranged around a table so they can see one another and the focus group leader.
2. If you have access to an overhead projector, it would be a good idea to transform the eight presentation charts included in this Section into overhead transparencies. Otherwise, you may want to copy them in sufficient numbers to permit each participant to have a set. Take a minute to look over the eight charts right now.

Bring along a second person to record comments

3. You will need a chalkboard or flip chart to record the responses of the participants during the meeting. *If possible, bring along a second person to take notes and record participants' comments.*
4. All participants should be given pads and pencils for making notes and diagrams.

Plan your materials to fit the interests of the participating firms

5. Familiarize yourself carefully with the materials found in this Section of the Handbook—the Focus Group Discussion Guide and the presentation charts that accompany it, the Intake Form, the Give & Get Matrix, and the Meeting Evaluation and Meeting Analysis Forms—before starting out. You may also want to consider using some or all of the Network Planning Forms found at the end of section one of the Handbook to get people thinking. Plan your use of materials to fit the interests of the participating firms.
6. Be prepared to discuss concrete follow-up activities at the conclusion of each focus group.
7. As participants arrive, pass out Intake Forms (a model form is included below).

8. During each focus group session, listen and observe carefully. If you are aware of the dynamics within your groups, you will be able to manage potential conflict and run successful meetings.

After each focus group session, complete the Meeting Analysis Form

9. Set some time aside after each focus group session to complete a Meeting Analysis Form (see below) to analyze what you have learned about participants' network needs and to plan your next steps.

Focus Group Draft Agenda

Time Allowed	Theme/Special Materials
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________

AGENDA FOR A TYPICAL 1.5 HOUR FOCUS GROUP SESSION

Feel free to delete, add, revise, and re-order these elements to suit the special needs of your focus groups. Sample charts from which overhead transparencies (OT) can be made follow this section.

I. MODERATOR'S INTRODUCTION

A. Introduce yourself (and the organization you represent).

B. Briefly mention some of the principal challenges facing industry in your region. Describe the focus group as an opportunity for local manufacturers to explore new ways to solve common problems.

C. Collect Intake Forms and check recorded information while focus group participants introduce themselves to one another. Ask them to state:

1. Type and location of business.
2. Their position in the firm.
3. Principal products or services of their firm.
4. Key objectives for firm growth/improvement.

D. Display the first overhead transparency (OT): **Meeting Objectives** (or refer to the copy in the hands of each participant). Read the Objectives and Shared Goals. What do the participants wish to add?

II. SUPPLIER CHAINS AND THE SITUATION OF MOST SMALL MANUFACTURING FIRMS TODAY

A. Display OT: ***Small Firm Supplier Chains***

Traditionally small firms are links in "chains of value added" organized by bigger companies. In general, only about 30 percent of manufacturing firms with 100 or fewer employees produce finished goods for end-use markets. As noted on the overhead, in this situation small firms are at risk. Because small firms don't often have strong marketing or product development capacity, they are dependent on big firms. They suffer when big firms lose market share—or turn to foreign suppliers.

ASK: how many of those in the group have been in this position? Draw out two or three brief examples, then move on to networks.

B. Display OT: ***Small Firm Networks***

Small firms are being pushed out of OEM supplier chains as big corporations "re-engineer" their production systems. Working together in networks, small firms have a much better chance of meeting OEM targets for quality, JIT, and engineering support.

If firms choose to try to make the shift from OEM supplier to producer of proprietary products, networks are probably a necessary step. In Europe, many small firms have successfully developed new products for new markets by linking together in networks.

Indicate the black lines in the diagram that show the links between firms and between small firms and the market. Note that these links can be complementary manufacturing capabilities—different machines in different factories—contributing to the production of high value goods. These links can also represent shared services that cut individual overhead while improving each firm's performance.

From the OT, read: Network Advantages for Small Firms.

Note again that there are two basic types of networks—production networks and shared services networks.

ASK: How do small firms in (your region) work together to get jobs out on time? increase profits? to solve problems? Write participants' responses on flip chart. If no responses are given, ask specifically about local patterns of subcontracting, trade association membership, and other common forms of industry collaboration.

C. Display OT: ***A Production Network in Modena (Italy)***

Introduce this network example by telling the group that in the past fifteen years networks have become a common way of making and selling goods in Europe, especially in northern Italy, where small firms now dominate the industrial economy.

Tell the following story in your own words:

> FSM (the firm in the center) has three partners and 13 workers. It manufactures industrial robots for auto engine factories. To do this, it works in "partnership" with four local firms. Only the robot electric motors come from a big firm (Siemens in Germany). No longer solely suppliers to some bigger firm, the network companies incorporate more value added in their production—and earn higher profits.
>
> These small firm partners design as well as produce the electronic controls, hydraulic components, and other elements of robots. FSM concentrates on marketing, assembly

and testing. Most network members give about 25 percent of their effort to the robot project. This network is a clear case of "inseparability of returns." These firms need one another to stay in this profitable niche market.

This **manufacturing network** came about because the five firm owners met through a local trade association which has a conscious policy of promoting cooperation among member firms.

ASK: Are there similar examples here? What are the advantages to firms that link their complementary skills? What are the problems to be overcome in trying this idea?

D. Display OT: ***A Furniture Industry Service Network in Denmark***

Here is another story for you to tell in your own words:

In 1989, the Danish government launched a national network program. It was based on lessons from Italy. It involved a large number of network brokers. And it was a major success: in just a year *one-third of all Danish manufacturing firms were involved in at least one network.*

Farso is a small town in western Denmark. There are more than a dozen small wood furniture companies located there. For years, all of them produced "Danish modern furniture." In the late 1980s, the market shriveled, both in Europe and in the United States. In Farso, sales fell. Unemployment rose. Italian design came to dominate the furniture business.

None of these small firms employed professional designers or marketing managers. Their inability to respond to the shift in customers' taste led them to the brink of bankruptcy. A network broker suggested they share the high cost of designing new lines of furniture. After much discussion they jointly commissioned designs from a Dane trained in Italy. Their common designer convinced them to adopt CAD and helped them set up a joint training program to use it.

Before long they discovered that the new furniture required lacquered finishes. This was not something any of them had done. Worse, in a country with strict environmental legislation, lacquer application could only be done by robots in carefully-enclosed booths fitted with expensive air and water filters.

What had started out as a design-service network now expanded to include cooperative management of a shared lacquering facility. Although they had been suspicious competitors at the outset, in the end they had agreed to print a single catalog and collaborate on export market promotion. Collaborative innovation and cost sharing made the difference. They are doing well today.

III. NETWORKS FOR OUR REGION

A. Display OT: *Building Local Manufacturing Networks*

[Note that the overhead contains blank spaces. Fill these in before the session with the name of the industry you are meeting with, the number of firms in your area, and the total employment.]

Start the discussion by saying:

We have seen two network models. The first was a group of small firms linking their complementary capabilities to manufacture a high-value product. The second began as a response to the high cost of essential services—in this case, furniture design and marketing. In both cases, **the network was a direct and affordable solution to a problem common to a group of firms.**

ASK: What are the major problems faced by firms in your sector(s)?

Write the list of Common Problems on the chalkboard or flip chart. Probe for information on each Problem listed.

Encourage discussion. If one participant offers an idea, ask another to comment on it.

Ask the group to rank problems in order of importance. Discuss those on the flip chart one at a time: how many firms face this problem? what are they now doing about it? Write the problems on the overhead transparency in order of priority so the participants can see evidence of their common needs.

THE GIVE & GET MATRIX: A GOOD WAY TO GET IDEAS FLOWING

The Give & Get Matrix is an idea that comes from a Cleveland-based forging industry network. Note that a reproducible form and a sample set of responses from a forging industry network meeting is included at the end of this section. These responses will give you some ideas to propose if the firms in your focus group are reluctant to begin.

Pass out the Give & Get Matrix forms. Ask the participants to take a few minutes to write in each of the spaces provided:

- What they would be willing to sell to others in their industry (Give for pay)
- What they would be willing to give free.
- What they would buy from others (Get for pay)
- What they would expect to receive free in return for what they might give free

Stress evidence of cooperation. Use the completed Give & Get forms to show participants that they are more willing to help one another than they may have believed when they came to the focus group.

B. Display OT: ***Networks: Common Services for Improved Competitiveness***

Read the list of key services that firms say they need (see Get for free and Get for pay).

ASK: How many firms may need each service? If there is a similar service already available, ask: do you know about it? Is it useful? Why don't you use it? What is the problem today in obtaining needed services (low quality, high price, location, etc.)? What key services are missing?

As networks more often than not grow up around shared services, this is a key set of questions. Take careful notes of responses.

Have the group design a needed service. As they offer ideas, annotate the diagram on the overhead transparency (or use the flip chart or chalkboard to record suggestions).

C. Display OT: ***Brainstorming on Network Production***

Remind the group that this is the same diagram that was used to illustrate the robot manufacturing network in Italy.

Point out to the group that together they know a great deal more about products, markets, and the complementary capabilities of local firms than any one individual knows. Ask them to brainstorm, linking existing firms (theirs and others) together to make new kinds of products (or to make current products in new ways) for growing markets.

ASK: What new, high-margin markets might be open to firms that meld specialized capabilities? Do you have product ideas that could be developed in this way? What tough demands are big firms making on small ones? And can joint bidding and production help?

As ideas come out, record them where all can see.

IV. MODERATOR'S CONCLUSION

Go back very quickly through the flip chart.

ASK: What are the most important two or three ideas we have come up with?

Make a list of high priority projects on the flip chart.

ASK: Who will be willing to work on each one of these project ideas? what other firms should be brought into the discussion?

Make a list of volunteers by project.

Go around the table asking for final comments. Thank the group for participating. *Tell them what follow up actions you plan.*

FOLLOWING THE FOCUS GROUP SESSION

Save Intake Forms, Give & Get forms, and flip chart sheets. Copy any valuable material written on the chalkboard or on the overhead transparencies.

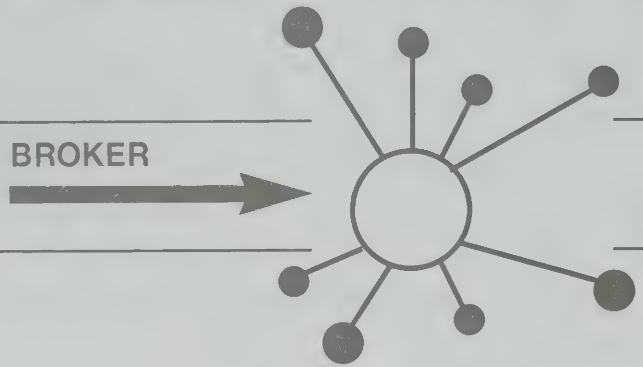
Complete the Meeting Analysis Form below for each focus group. Follow up quickly with the firms that participated in the focus group.

Annotate the list of potential projects and volunteers. Who seems particularly knowledgeable and energetic? Who are the likely leaders of the first network project? What are their immediate goals?

Use the space below for your notes.

More focus group ideas:

BUILDING SMALL FIRM MANUFACTURING NETWORKS



MEETING OBJECTIVES

- Learn about the Impact of flexible manufacturing networks abroad.
- Consider ways to use networks to improve your business–or the firms you work with.

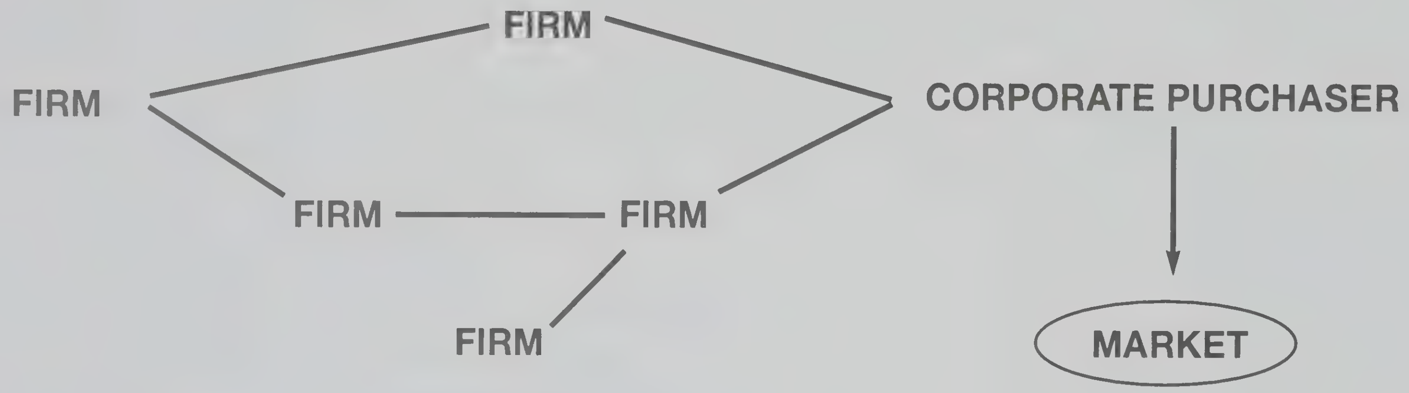
SHARED GOALS

- Make local manufacturing more competitive.
- Strengthen business assistance and training programs.
- Increase local revenues for better public services.
- Create opportunities for entrepreneurship.
- Generate more and better jobs.

SMALL FIRM SUPPLIER CHAINS

TRADITIONAL ROLES

- Big firms: Product design leadership, contact with market
- Small firms: Chains of value added



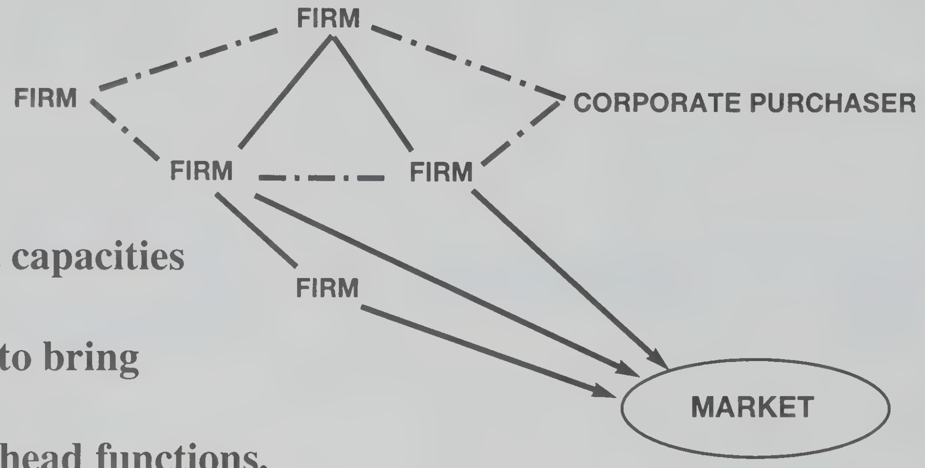
Issues

Small firms vulnerable to change in big firm market share and shifts in sourcing strategies.
Small firm limitations force dependence on big firms.

SMALL FIRM NETWORKS

FROM CHAINS TO NETWORKS

- Small firms build horizontal linkages to supplement vertical ties to big firms
- Networked in groups, small firms can perform like the best of big ones.



NETWORKS ADVANTAGES FOR SMALL FIRMS

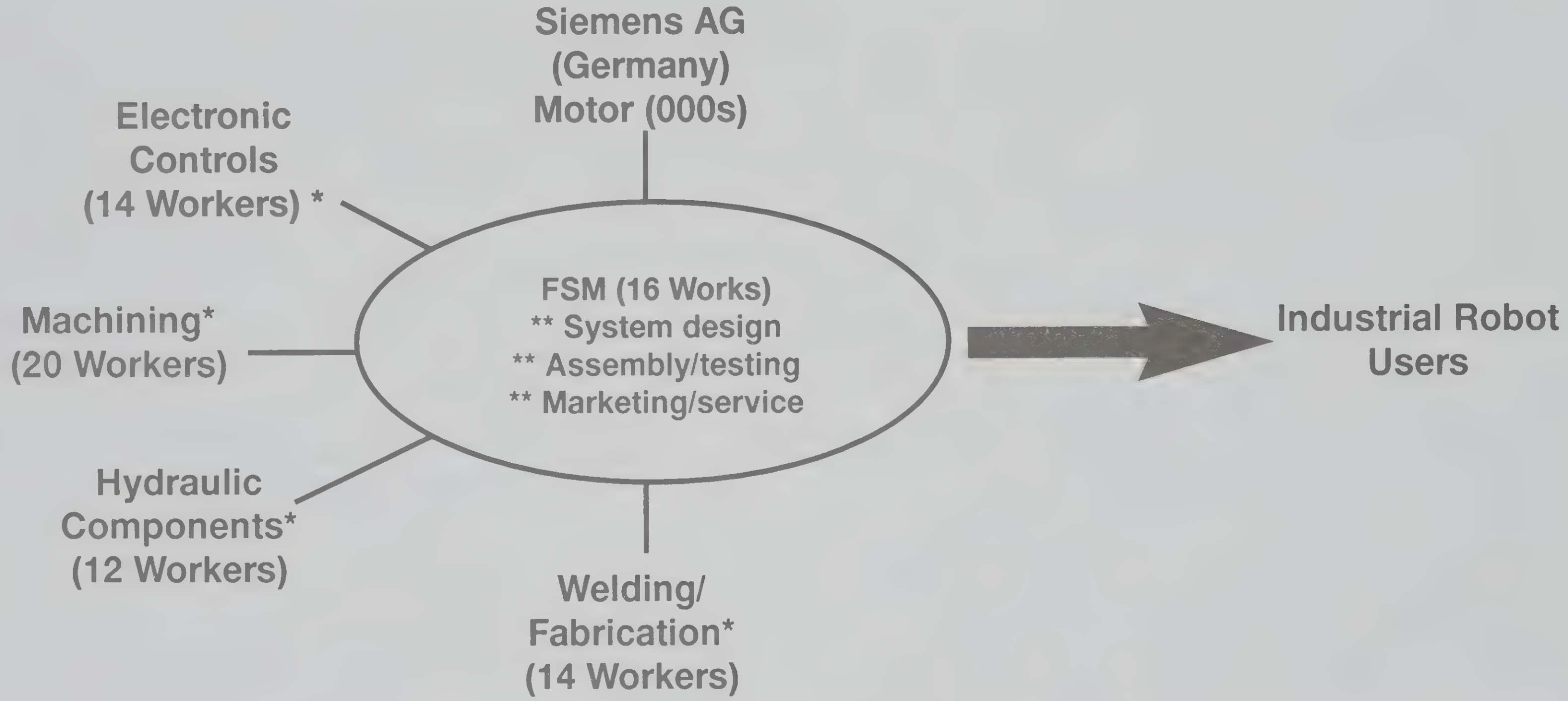
1. Join production and management capacities to serve large customers.
2. Link complementary capabilities to bring finished products to market.
3. Realize economies of scale in overhead functions, e.g., R&D, marketing, quality control, etc.
4. Cooperate in order to compete in global economy.

Query

How do small firms, here, work together to increase growth, profits?

A PRODUCTION NETWORK IN MODENA (ITALY)

MODENA IS A METALWORKING CENTER WITH 24,000 SMALL- AND MEDIUM-SIZED FIRMS. COOPERATION IS THE RULE.



Network Radius = Few Miles
Network Market = Global

*Responsible for both design and production.

Network initiated through common trade association membership.

A FURNITURE INDUSTRY SERVICE NETWORK IN DENMARK

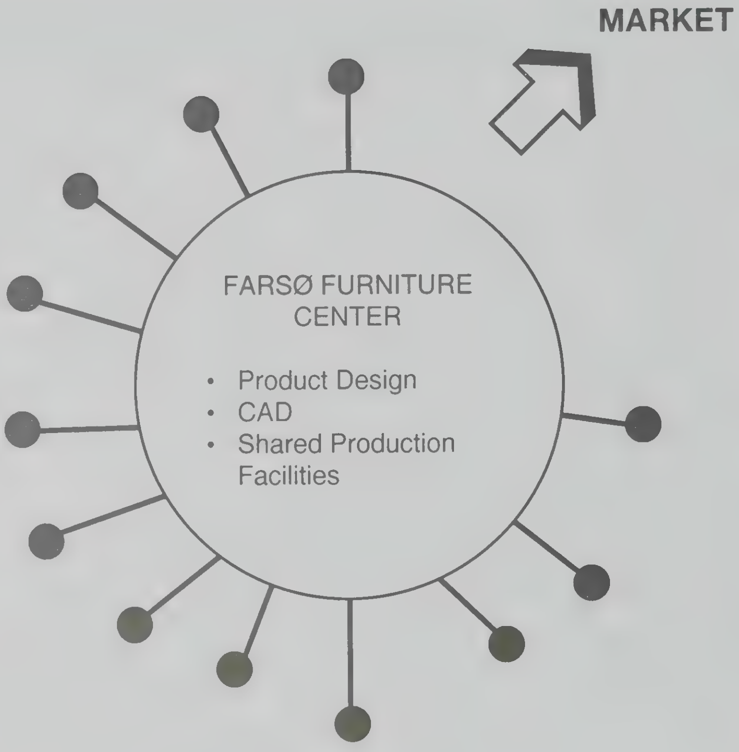
THE TRADITIONAL INDUSTRY IN FARSØ IS WOOD FURNITURE

COMMON PROBLEMS

- Collapse of U.S., European markets for "Danish Modern Furniture."
- Small firms structured for long runs of standard products.
- Design and marketing personnel rare in small firms.

COMMON SOLUTION:
THE FARSØ FURNITURE CENTER

History:
Local development official brings 14 firms together to discuss responses to market difficulties.
Twelve firms ultimately agree to jointly hire a professional designer–and invest in a shared robotic lacquering plant.
Firms now planning an integrated line of products and a common export marketing effort.



BUILDING LOCAL MANUFACTURING NETWORKS

INDUSTRY SECTOR ______________________________

NUMBER OF FIRMS ____________ NUMBER OF WORKERS ____________

WHAT ARE THE COMMON PROBLEMS? WHAT MIGHT BE SOME COMMON SOLUTIONS?

☐ Marketing

☐ Product diversification

☐ Working capital

☐ Adopting new technologies

☐ Equipment loans and leases

☐ Worker/management training

☐ ____________________

☐ ____________________

____

____

____

____

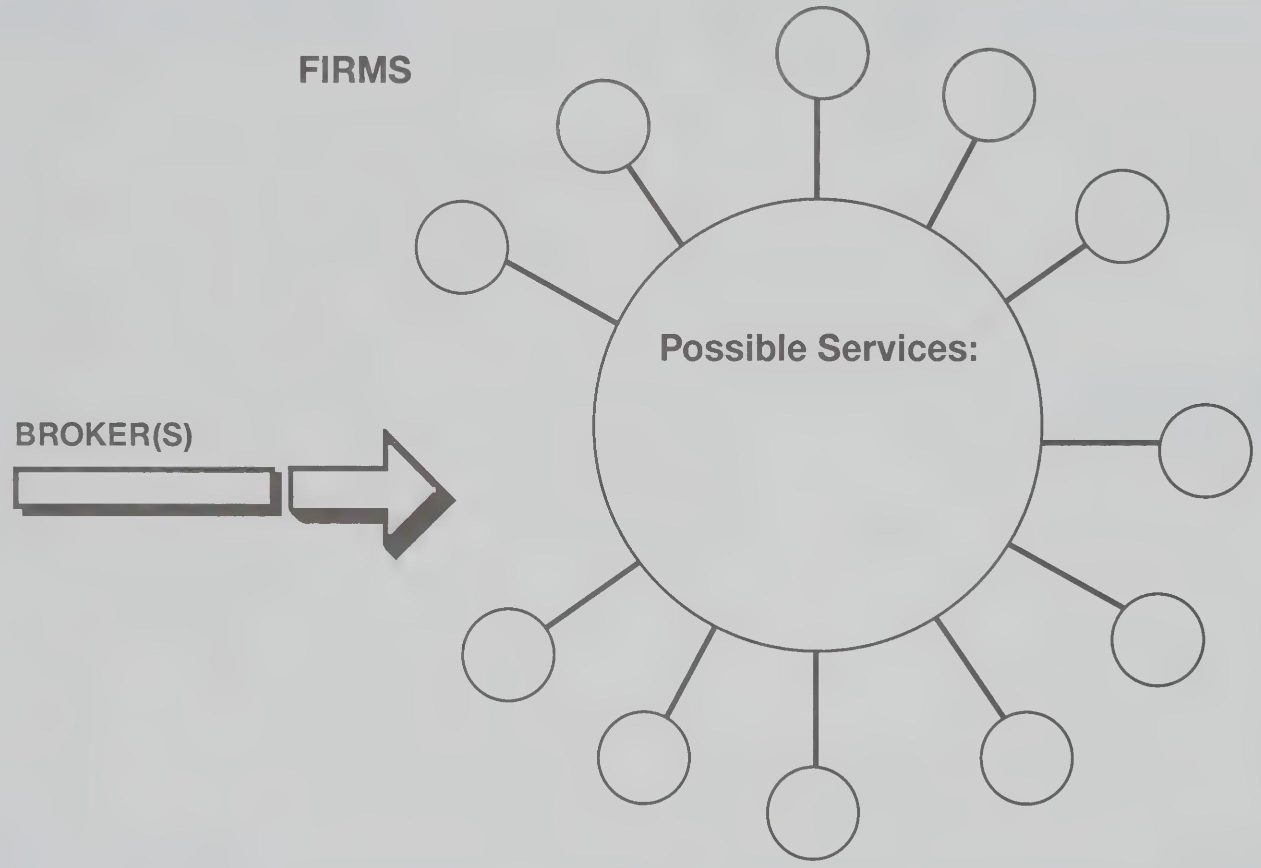
____

____

Issue ______________________________

Who should take the lead in bringing firms together to solve problems?

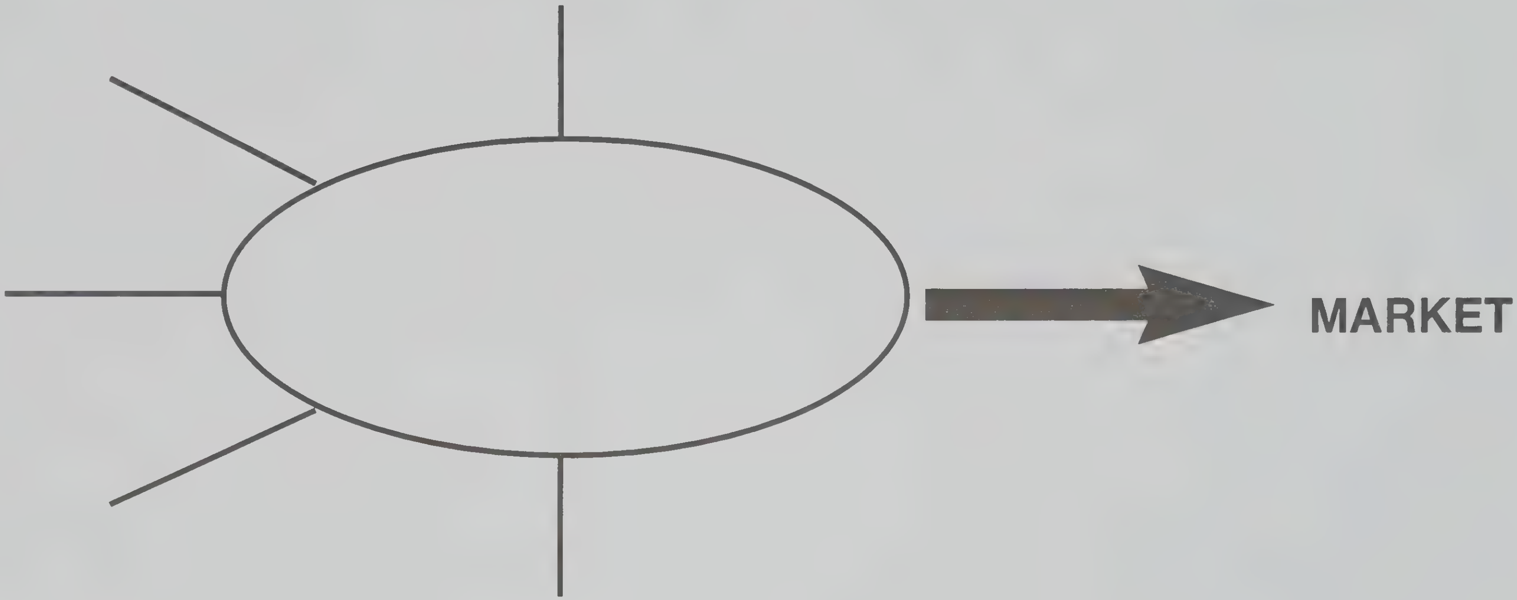
NETWORK HUBS: COMMON SERVICES FOR IMPROVED COMPETITIVENESS



BRAINSTORMING ON NETWORK PRODUCTION

IDENTIFY MARKET
DESCRIBE PRODUCTS

LOCATE COMPLEMENTARY CAPABILITIES



Issue

How can we begin to overcome suspicion, create trust, build effective networks?

Focus Group	Name: ______________________
	Firm: ______________________
Give & Get Matrix	Date: ______________________

	GIVE	GET
FREE		
FOR PAY		

The Ohio Forging Network
Sample Give & Get Matrix Responses

Give for Free

- Network Participation
- Access to library of specifications
- Access to quality systems
- Sales leads
- Engineering advice
- Lend on shelf spare parts
- Quote opportunities
- Training
- Problem solving
- Opportunities to share business
- Information re: International trade
- Joint material purchasing
- Quality control consulting
- Shared equipment

Get for Free

- Cost saving opportunities
- Marketing assistance and tips
- Joint materials purchasing
- Training - SPC, Quality
- Information re: OSHA, EPA, health
- RFQ handoffs
- Advertising
- Opportunities for joint ventures
- Government specifications
- Borrow spare parts in emergency
- Technical advice
- Inquiries for new business

Sell (give for pay)

- Production capability
- Materials
- Forgings
- Heat treating
- Machining
- Laboratory testing
- Computer Aided Engineering (CAE)
- Computer Aided Design (CAD)
- Expertise
- Quality control consulting
- Welding and repair (Dies)
- Product development
- Manufacturing reps
- Distribution capability
- Plant engineering

Buy (get for pay)

- Materials
- Research & Development
- Advertising
- Technology
- Group purchasing
- Assistance in regulatory compliance
- Training
- Machining
- Heat treating
- Desktop publishing
- Forgings
- Metallurgy lab services
- Engineering
- Tooling
- Marketing

Not to be included

- Customer Lists
- Marketing plans

Modify this focus group intake form to suit before duplicating.

FOCUS GROUP INTAKE FORM

Your name: ________________________ Firm name: ________________________

All information will be held in strict confidence.

1. TECHNOLOGY STATUS. In terms of production equipment and systems, do you consider your firm to be:

Check one
_____ Advanced
_____ Conventional
_____ In need of modernization

2. PRINCIPAL PURCHASES OF PARTS OR MATERIALS % of Purchases

________________________ ________

________________________ ________

3. PRINCIPAL PRODUCTS/MANUFACTURING SERVICES % of Output

________________________ ________

________________________ ________

4. MAJOR MARKETS. Rank purchasing sectors in order of importance:

1. ________________________
2. ________________________
3. ________________________

5. TRADE ASSOCIATION AND BUSINESS ORGANIZATION MEMBERSHIPS:

____

____

FOCUS GROUP EVALUATION FORM

For use by focus group participants

1. Please rate the following on a scale of 1-5 (where 1 is very good):

Network concept	_____
Network presentation	_____
Broker's ability to explain and answer questions	_____

Comments on the focus group:

____

____

2. I think the best use of networks in my business would be:

____

____

3. I see the biggest problems in forming a network are:

____

____

4. I would like to know more about:

____

____

Add other comments here.

Please sign your name:

Thank you for you participation in the network focus group.

FOCUS GROUP MEETING ANALYSIS FORM

For Use By Broker

Sector______________ Your Name ____

1. Meeting place and date:

   Attach list of participants (names, firm names, addresses, principal products). Note names of volunteers and the projects they wish to work on.

2. Describe participants' responses to the network models. Use additional sheets as necessary.

   A. Robot **manufacturing network.**

   B. **Services network** in the furniture industry.

   Which model had the most support? Why?

   Which the least? Why?

3. A. List the Common Problems mentioned in order of importance, noting the types of firms that showed most interest (by size, SIC group, etc.).

   B. List Common *Solutions* suggested (related to *Problems* above). Review the completed Give & Get Matrices.

4. List the service needs mentioned in the Give & Get matrices in order of importance. Note reasons for each.

5. Describe manufacturing networks discussed in the brainstorming session. What examples of actual collaboration were mentioned?

6. What high priority projects had substantial support? Which involved new business opportunities?

7. What was the general attitude of the participants toward cooperating networks at the conclusion of the meeting? What are the principal problems you must overcome as network broker?

8. Based on this focus group, what should be the first group activity for the participating firms?

Use the planning form on the following page to describe an initial network project. Note which firms should be asked to take the lead on each possible project.

FOCUS GROUP ANALYSIS

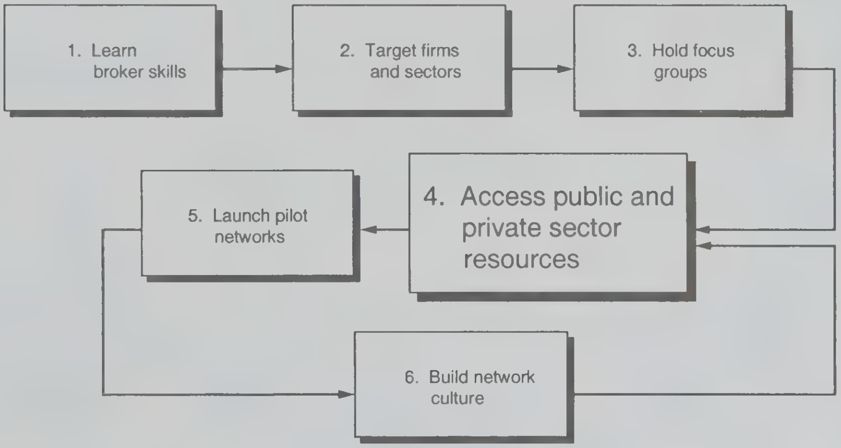
NETWORK PROJECT IDEAS

LIST IN RANK ORDER	PROJECT CONCEPT	RESOURCES NEEDED	LEAD FIRM(S)
1. Needs expressed •			
•			
•			
2. New business opportunities			
•			
•			
•			

What fees should firms be willing to pay for assistance with each of these projects?

SECTION FOUR:

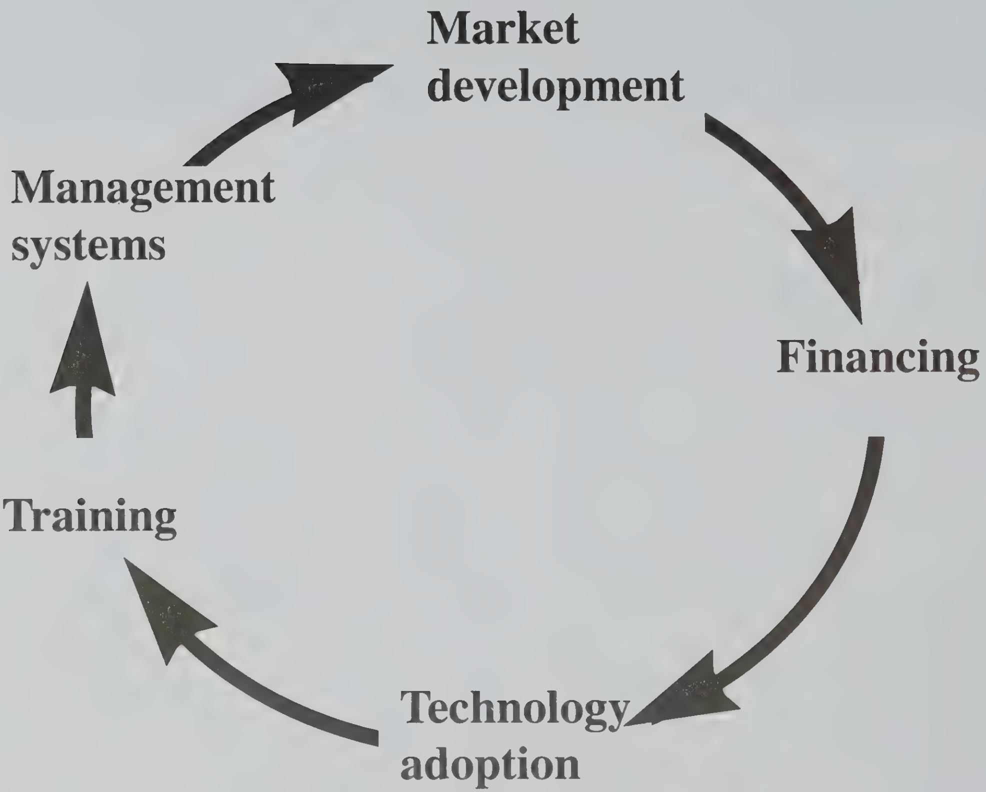
RESOURCES FOR MANUFACTURING NETWORKS



STEP FOUR IS TO IDENTIFY THE TECHNOLOGY, BUSINESS ASSISTANCE, FINANCING, AND OTHER RESOURCES MANUFACTURING NETWORKS NEED. IN THIS SECTION YOU WILL READ ABOUT:

- **THE CONCEPT OF THE CIRCLE OF MODERNIZATION**
- **LIMITATIONS OF SMALL FIRMS AND THE NEED FOR OUTSIDE RESOURCES**
- **INVESTIGATING RESOURCES FOR MANUFACTURING NETWORKS**
- **HOW TO ACCESS RESOURCES FOR TARGET SECTORS**

The Circle of Modernization



In the struggle to remain competitive, market development, financing, technology, training, and modern management are all important.

Brokers identify and coordinate comprehensive resources, connect firms to the service they need most, and move them steadily around the Circle of Modernization to master the skills of world-class producers. Good network brokers:

- Know the relevant business services available from public and private sector providers.
- Understand that organizing available resources and coordinating their delivery to solve business problems is a valuable service. Collective access to valuable resources is a key to network growth.
- Listen to network "customers" and accept their definition of need as an appropriate project starting point. This rule holds even when the broker is able to spot more serious problems.
- Respond to a network's stated needs on a business timetable. This makes it essential to have done your homework beforehand and know what services network firms may require.

THE CIRCLE OF MODERNIZATION

In international competition, there is little room for second-rate companies

In industry sectors exposed to international competition, there is little room for second-rate companies. Today's global marketplace rewards companies that demonstrate:

- Mastery of strategy
- A clear focus on customer needs
- Sophisticated technology and logistics
- Excellent management information systems
- Regular upgrading of work force skills, and
- Access to affordable capital

The Circle of Modernization shows how these business competitiveness requirements are part of an on-going process essential to maintaining world-class manufacturing skills.

It is the network broker's job to identify and deliver the resources small firms need to achieve sustainable competitive advantage

Staying up with the circle of modernization is a tall order for small manufacturing firms. But nothing less will do in the long run. Networks have a critical role to play. Cooperation will greatly facilitate access to modernization resources. It is the network broker's job to identify and deliver the resources small firms need to achieve sustainable competitive advantage.

Brokers must enable firms enter the Circle of Modernization at any point

Brokers must be prepared to help firms enter the Circle of Modernization at any point they choose—and then help them move steadily around the circle until they reach world class status.

Your business background probably prepares you to handle personally one or more of the challenges your network clients face. If you are an engineer, you probably have next-step technologies under control. But you may need help with market development or financing. If you come from marketing, management information systems and worker training may well be unfamiliar. It seems almost certain that you will need partners to do the entire job described by the Circle of Modernization. This section of the Handbook will help you to find resources that complement your own skills.

In most regions of the United States, business assistance services are surprisingly plentiful

Resource research forms. In most regions of the United States, business assistance services are surprisingly plentiful. However, there are sometimes problems regarding quality, accessibility, and cost. The forms in this section of the Handbook will help you investigate services available to your target industries.

RESOURCES FOR MODERNIZATION

In the process of modernization, manufacturers will need help from a variety of resources, including:

State and Local Governments	Direct loan and loan guarantee programs Funds for worker training Export promotion Business planning
CommunityColleges and Universities	Work force training courses Management seminars Research & development Technology transfer
Federal Laboratories; NIST Manufacturing Technology Centers	Technology licenses Cooperative research Technology extension
Private Sector Services	Business consulting Marketing Advertising and promotion Contract engineering Finance

Build up a file of printed materials describing available services

Begin with a call to your state's commerce or economic development department. Request printed material describing all business and industry service programs. Every time you make a resource contact, ask about additional service providers. Keep the circle of modernization in mind. As you go along, build up a file of printed materials describing available resources.

Note—Visit key program directors to develop personal contacts and discuss your networks' particular needs.

State contact ______________________________

Telephone ______________ Date contacted __________

Check business references for each service you use carefully

A note on quality control: As network firms may hold you responsible for the performance of the resources you bring to their networks, make sure to check business references for each service you plan to use.

CREATING AN INDUSTRY SERVICES DIRECTORY

A useful *Industry Services Directory* can easily be created on a personal computer using common data base software. Here are some procedural suggestions.

- Draw up a list of available services. Check completeness with local firms and pubic sector agencies.
- Draft entries and check correctness of information with service providers.
- Use one page (two sides, if necessary) for each entry. In the upper left corner put firm name/address/phone and fax/contact. At the upper right, a description of the key service. Complete the entry with a list of services and other relevant information.
- Ask a local public utility or bank to design and print the guide.

INDUSTRY SERVICES CHECKLIST AND DATA GATHERING GUIDE

An annotated Directory might encourage local firms to make better use of existing services. If such a directory does not exist for your region, here is a guide to the information to be collected.

Types of services to be included (a section for each, alphabetically within sections). Include organization name, address, telephone, contact name, services descriptions, and business references:

NIST Manufacturing Technology Centers and State manufacturing extension programs
Management consultants by specialty
Management training
Universities, colleges, and community colleges
Computer systems consultants—for both hardware and software
Work force training programs
Employment services
Financial services offered by the public sector
Marketing assistance (export agency, private consultants)
Manufacturers representatives
Advertising and public relations (only industry specialists)
Engineering services by specialty, e.g., plant layout, engineering design, etc.
Quality control and quality management specialists
Professional societies (SME, APICS, ASQC, etc.)
Industrial designers
Testing laboratories for industry
Environmental compliance assistance
Specialized industry accountants
Patent attorneys and patent assistance
Sources of information regarding government programs and regulations
Other

Services need not be located within your region—but they must be available to local manufacturers.

Other useful information to include:

1. Cost of services.

2. Examples of recent work (especially for designers, engineers, consultants).

3. Other office locations, if any.

4. Regulations controlling access to services (may be firm's size, sector, location, etc.)

5. Client references.

Note that some large services providers such as technical colleges will appear in the guide more than once. One way to handle this is to include a detailed listing at the first entry and brief references in other relevant sections.

BUILDING A DATA BASE OF NETWORK RESOURCES

A set of worksheets for gathering and recording information on network resources follows. A single form is provided for each of these service categories:

State and local economic development agencies
Community colleges and other training institutions
University and other technology sources
Federal laboratories and NIST Manufacturing Technology Centers
Private sector business assistance

A blank form is included for additional resource categories. *Make a list here of services your target sector badly needs to achieve sustainable competitive advantage.*

ACCESSING NETWORK RESOURCES: STATE AND LOCAL ECONOMIC DEVELOPMENT ORGANIZATIONS

TARGET SECTOR______________________________

PROVIDER ORGANIZATION	SERVICES	BUSINESS REFERENCES	APPLICATIONS, REGULATIONS, FEES	CONTACT INFORMATION

ACCESSING NETWORK RESOURCES: COMMUNITY COLLEGES AND OTHER TRAINING INSTITUTIONS

TARGET SECTOR____

PROVIDER ORGANIZATION	TRAINING OFFERED	BUSINESS REFERENCES	APPLICATIONS, FEES, ETC.	CONTACT INFORMATION

ACCESSING NETWORK RESOURCES: UNIVERSITY AND OTHER TECHNOLOGY SOURCES

TARGET SECTOR____

PROVIDER ORGANIZATION	AREAS OF TECHNICAL EXPERTISE	BUSINESS REFERENCES	APPLICATION PROCEDURES	CONTACT INFORMATION

ACCESSING NETWORK RESOURCES: FEDERAL LABORATORIES AND NIST MANUFACTURING TECHNOLOGY CENTERS

TARGET SECTOR____

LABORATORY OR CONSORTIUM	TECHNOLOGY R&D AND TRANSFER SERVICES	BUSINESS REFERENCES	PROCEDURES, FEES, ETC.	CONTACT INFORMATION

ACCESSING NETWORK RESOURCES: PRIVATE SECTOR ASSISTANCE

TARGET SECTOR____

COMPANY OR CONSULTANT	SERVICES	BUSINESS REFERENCES	SCHEDULE OF CHARGES	CONTACT INFORMATION

ACCESSING NETWORK RESOURCES:

TARGET SECTOR____

ORGANIZATION	SERVICES	BUSINESS REFERENCES	ADDITIONAL DATA	CONTACT INFORMATION

NIST Manufacturing Extension Partnership

Arizona Applied Manufacturing Center
Phoenix, Arizona
(602) 392-5184

California Manufacturing Technology Center (CMTC)
Hawthorne, California
(310) 355-3060

Pollution Prevention Center
Santa Monica, California
(310) 453-0450

Connecticut State Technology Extension Program
Storrs, Connecticut
(203) 486-2585

Delaware Manufacturing Alliance
Newark, Delaware
(302) 452-2520

Georgia Manufacturing Extension Alliance
Atlanta, Georgia
(404) 894-8989

Chicago Manufacturing Technology Extension Center
Chicago, Illinois
(312) 265-2020

Iowa Manufacturing Technology Center
Ankeny, Iowa
(515) 965-7040

Mid-America Manufacturing Technology Center (MAMTC)
Overland Park, Kansas
(913) 649-4333

MAMTC Colorado Regional Office
Fort Collins, Colorado
(913) 649-4333

MAMTC Southern Missouri Regional Office
Rolla, Missouri
(913) 649-4333

Kentucky Technology Service
Lexington, Kentucky
(606) 252-7801

Maryland Manufacturing Modernization Network
Baltimore, MD
(410) 333-6990

Massachusetts Manufacturing Partnership (MMP)
Boston, Massachusetts
(617) 292-5100

Midwest Manufacturing Technology Center (MMTC)
Ann Arbor, Michigan
(800) 292-4484

Upper Midwest Manufacturing Technology Center (UMMTC)
Minneapolis, Minnesota
(612) 338-7722

Nebraska Industrial Competitiveness Service (NICS)
Lincoln, Nebraska
(402) 471-3769

New Mexico Manufacturing Extension Program
Albuquerque, New Mexico
(505) 272-7800

New York Manufacturing Extension Partnership
Troy, New York
(518) 283-1010

Hudson Valley Manufacturing Outreach Center
Fishkill, New York
(914) 896-6934

Manufacturing Outreach Center of New York-Southern Tier
Binghamton, New York
(607) 774-0022

New York City Manufacturing Outreach Center
New York, New York
(212) 240-6920

Western New York Manufacturing Outreach Center
Amherst, New York
(716) 636-3626

Great Lakes Manufacturing Technology Center (GLMTC)
Cleveland, Ohio
(216) 432-5322

Miami Valley Manufacturing Extension Center
Kettering, Ohio
(513) 259-1340

Plastics Technology Deployment Center (PTDC)
Cleveland, Ohio
(216) 432-5300

Oklahoma Industrial Extension System
Tulsa, Oklahoma
(918) 592-0722

Manufacturing Extension Partnership of North/East Pennsylvania
Bethlehem, Pennsylvania
(610) 758-5599

Southwestern Pennsylvania Industrial Resource Center
Pittsburgh, Pennsylvania
(412) 687-0200 ext. 234

Southeast Manufacturing Technology Center (SMTC)
Columbia, South Carolina
(803) 252-6976

Tennessee Manufacturing Extension Partnership
Nashville, Tennessee
(615) 741-2994

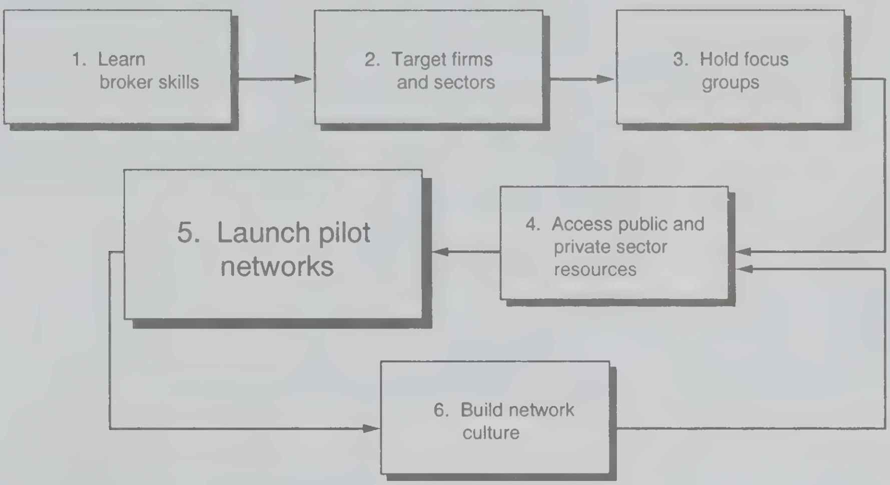
A.L. Philpott Manufacturing Center
Martinsville, Virginia
(703) 666-8890

Washington Alliance For Manufacturing
Seattle, Washington
(206) 622-3456

Northwest Wisconsin Manufacturing Outreach Center
Menomonie, Wisconsin
(715) 232-2397

SECTION FIVE:

ORGANIZING PILOT NETWORK PROJECTS



STEP FIVE IS LAUNCHING NETWORKS. THIS SECTION OF THE HANDBOOK HELPS BY EXPLAINING:

- **WHY SERVICE NETWORKS USUALLY COME FIRST**
- **CRITERIA FOR PILOT NETWORK PROJECT DESIGN**
- **HOW TO PLAN NETWORK PROJECTS FOR MAXIMUM IMPACT**
- **HOW TO FIND WORKING CAPITAL FOR NETWORKS**

SERVICE NETWORKS: BUILDING TRUST

In the Introduction to the Handbook, it was pointed out that in the traditional American way of doing business, individual companies are expected to cope by themselves with the massive changes occurring in the competitive environment. Regardless of size, U.S. firms are expected to manage technology selection, worker training, procurement, manufacturing operations, R&D, marketing, and sales.

We know that more and more foreign manufacturing economies are gaining on us by fostering a different kind of industrial system—one in which cooperation is the basis for competitive success. In Germany, Italy, Denmark, Japan, and other countries, public sector programs actively promote interdependent relationships among firms. The end result is that production is organized through consciously-collaborating networks of producers, suppliers, and customers.

If American companies are to work together, trust must replace suspicion

United States business culture, on the other hand, continues to stress competition, privacy, and individual advantage. If American companies are to work together, trust must replace suspicion. And trust must be built, step-by-step. It is up to the broker to help firm owners discover that:

- The real competition is no longer coming from down the street or the next town—but from other countries and continents.
- Best manufacturing practice standards are known world-wide. The same process technologies are available on all continents. Production secrets are rare today.
- Network cooperation is necessary if small firms are to compete in a global market.

Trust is learned

It is the broker's job to move networks to complex forms of cooperation

Because trust must be learned, it is often wise to begin with network projects that are *pre-competitive* in nature. It is commonly said that service networks come before production networks. This is so because service network participation—for example, in joint work force training or materials procurement—requires little or no loss of members' autonomy and minimal risk of losing control of "business secrets." It is the broker's job to move networks steadily along from the simplest group activities to complex forms of cooperation that make a real difference in margins and growth.

RULES FOR STARTING OUT

Here are a set of initial network project design rules to consider:

1. *Avoid projects that affect the core businesses* of participating firms or that involve proprietary information such as customer lists, key vendors, internal costs, or pricing policies.

Focus on common needs

2. *Focus on common needs.* Early projects should benefit network participants equally and deal with common problems such as work force recruitment, quality training, or group insurance.

3. *Address strategic issues.* If firms are to continue to invest time in networks, project success must be measurable on the bottom line.

4. Make sure that *network services are only available to active network members.* If firms can access services individually, they will opt to do so.

5. Plan for *quick successes.* Design projects to have many brief phases and clear milestones, and make sure network participants understand what has been accomplished at every stage.

Make project success dependent on responsible participation

6. Organize projects to *foster ownership, interdependence, and trust.* Carry out projects with, not for, companies. Divide project responsibilities so every firm has a clear role and a stake in the outcome. Make project success dependent on responsible participation. Rotate meetings through participating plants to help members learn more about their group's capabilities. Include social events such as breakfasts or dinners in network agendas.

7. *Propose alternatives.* Listen to what firms say and evaluate it against what you are learning about their market environment and competitors' behavior—but *don't be afraid to make concrete proposals.* In fact, the best way to get new networks to stretch their visions of what they can do is to debate the merits of a strategic project idea brought to them by a knowledgeable broker.

Networks do not have to move forward in the same direction, for the same reasons, at the same pace

Encourage diversity

8. *Avoid lockstep planning.* Too many failed networks have assumed that all members must move forward in the same direction, for the same reasons, at the same pace. Firms, even those in the same industry using the same technologies, are different in many ways, including markets, business objectives, management sophistication, and willingness to take risks. Encourage diversity. Examine alternatives. You may

end up with several networks rather than one. You will also create deeper commitment and experience less conflict. Build membership in network projects by requiring interested firms to recruit the additional partners they need from among their industry colleagues.

Be sensitive to entrepreneurs' fears

9. *Be patient.* American firms are new to network cooperation. Let them grow comfortable with the idea of collaboration slowly and at their own pace. Be sensitive to entrepreneurs' fears. Remember that small firm owners are accustomed to independent decision making. Show them how networks can help them achieve their own personal business goals. Ease them into cooperation by bringing them resources they wouldn't have been able to access on their own.

NETWORK PROJECT PLANNING

A self-explanatory, five-step network planning process is outlined on the worksheets that follow. Before you start developing your plan, review your own goals for network development. How will you evaluate your projects and progress in six months? one year?

Write your evaluation criteria in the space below.

NETWORK PROJECT PLANNING FORMS

STEP 1: RANK POTENTIAL NETWORK PROJECTS

DESCRIBE COMMON NETWORK PROBLEMS	DESCRIBE POTENTIAL PROJECT PAYOFFS	ESTIMATED TIME TO PAYOFF	LEAD FIRM(S) FOR EACH PROJECT
COMMON NETWORK BUSINESS OPPORTUNITIES			

Notes: 1. Rank problems and opportunities first by industry perceptions of importance and then on the basis of your assessment of impact on firm performance. 2. Estimate time to payoff in months.

STEP 2: PRELIMINARY PROJECT PLAN TO SOLVE A *COMMON BUSINESS PROBLEM*

DEFINITION OF PROBLEM ______________________________

PROJECT GOAL ______________________________

NETWORK FIRMS' OBJECTIVES	RESULTS/OUTCOMES	RESOURCES NEEDED	WHO IS RESPONSIBLE FOR EACH OUTCOME?

Note: 1. Quantifying expected outcomes (e.g., number of workers trained, installation of CAD systems) provides a basis for project evaluation. 2. Resource needs should include information on costs, application requirements, key contacts for negotiating agreements. 3. Principal responsibility for each each outcome may fall to you as broker, or to a firm, or to an outside resource. Ask yourself: are the skills and incentives involved sufficient to ensure successful project completion?

STEP 3: PRELIMINARY PROJECT PLAN TO REALIZE A *COMMON BUSINESS OPPORTUNITY*

DEFINITION OF OPPORTUNITY ____

PROJECT GOAL ____

NETWORK FIRMS' OBJECTIVES	RESULTS/OUTCOMES	RESOURCES NEEDED	PRINCIPAL RESPONSIBILITY FOR EACH OUTCOME

STEP 4: PROJECT SELECTION AND PLAN FOR IMPLEMENTATION

BRIEF DESCRIPTION OF NETWORK PROJECT SELECTED:

APPROPRIATE LEGAL FORM FOR NETWORK ____________________

STEP 5: OUTLINE BUSINESS PLAN FOR A *PRODUCTION NETWORK*

A. Descriptive Name of Network

B. Business Objectives

C. Participating Firms

D. Participating Firms' Core Capabilities

3. PROPOSED PROJECT SCHEDULE

PROJECT ACTIVITIES MONTH	1	2	3	4	5	6	7	8
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								

E. Outline Budget

Salaries and consulting fees ____________________

Materials/equipment ____________________

Marketing ____________________

Other ____________________

Total cost ____________________

F. Projected Sources of Funds

From participating firms ____________________

Outside equity ____________________

Bank loans ____________________

Other source and sum ____________________

Total needed ____________________

G. Mission Statement for Network

____

____

____

____

H. Products/Services Network will sell

____

____

____

I. Markets for Network Products/Services

____

____

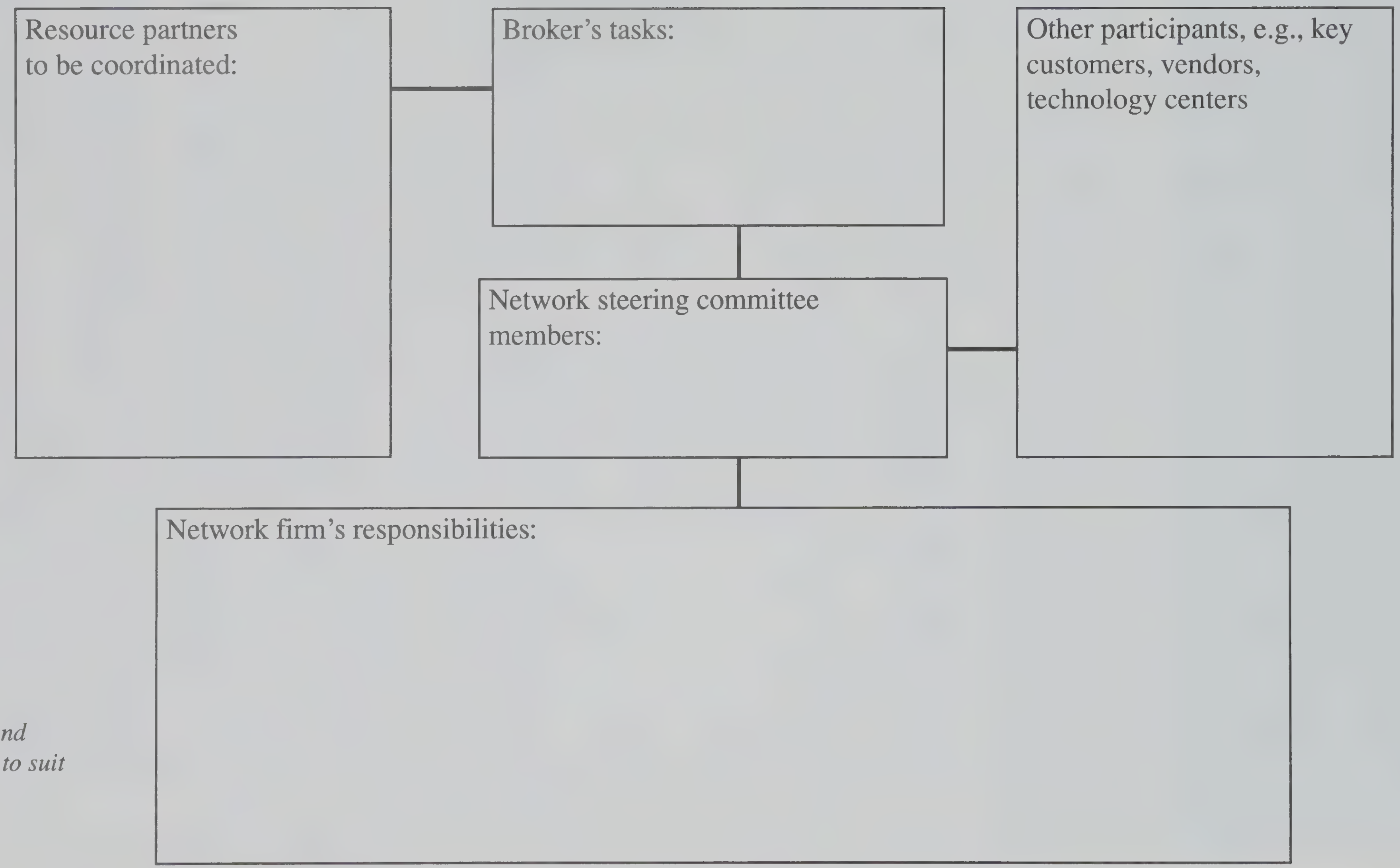
____

J. Description of Network Competitors and Their Business Strategies:

Resources Network Will Need

Sources

NETWORK PROJECT MANAGEMENT CHART



Label and redraw to suit project

Small firms have difficulty obtaining working capital in the best of times. Here is an idea from Europe that may solve the capital access problem for the networks you are organizing.

Loan Guarantee Cooperatives for Small Firm Financing

In France, West Germany, and Italy, Loan Guarantee Cooperatives (LGC) play a key role in assuring small firms access to working capital and medium-term loans. The following description is based on the actual workings of the Loan Guarantee Cooperatives in a metalworking district in north-central Italy.

Negotiated Arrangements

LGC are generally sector-specific. Each is a separate, nonprofit company. Membership ranges from several dozen to several hundred firms. Loan terms and rates are negotiated directly between LGC and the bank they choose. The basic purpose is to increase the availability and reduce the cost of working capital to finance inventory, develop new products, enter new markets. Established LGC are able to make the following sort of banking deal:

- Having reached an agreement with a bank regarding borrowing terms, each LGC member firm opens an account, keeping perhaps $5000 on deposit. Funds cannot be withdrawn without bank permission. In addition, members give personal notes to the bank for, in our example, another $5000. A LGC with 20 members, then, would have $100,000 on deposit and personal totalling $100,000 at the bank for a total of $200,000. (The dollar amounts are illustrative only.)

- The bank, for its part, agrees to lend an amount which is a multiple (the range is 10-40) of the total of LGC deposits and notes. Let us say that our LGC has a good record and has arrived at a multiple of 20, or an aggregate line of credit of $4 million for its members. Loan terms and conditions are similar to those given the largest corporate borrowers.

- Each LGC's Board manages its group's line of credit, reviewing loan applications and deciding how much any single firm may draw down.

- In the case of loss, the banks first invade the compensating balances on deposit in equal measure. Should the shortfall be greater, they would then call in notes (or portions of notes) to cover an agreed upon share of the bad loan. The remainder of the risk is taken by the bank. Note that 50-50 risk sharing is common, but not universal. In some well-established LGC, the banks take a larger share.

Administration

The larger LGC—those with 100-plus member firms—have full-time staff; even small ones have parttime assistance from banking professionals, volunteer boards, and loan committees that pre-screen loans and pass on to the bank those the LGC is willing to guarantee. Most LGC charge their members a small fee for loan processing. If the loan goes through, the LGC may mark up the loan on the order of one percent of face value. Fees earned are used to cover administrative costs, expand membership, and provide financial management assistance to member firms.

Benefits to Participating Banks

- Peer pressure among LGC members cuts down sharply on non-performing loans. The standard line in Italy is "small firm owners that get direct loans stay up nights thinking up ways to avoid repayment. Small firm owners who get loans through LGC stay up late figuring out how to make their payments on time."

- Bank risk is reduced—loans are pre-screened and LGC cover a significant part of any loss.

- LGC aggregate loans and reduce bank transaction costs—the biggest reason American banks avoid small firm loans.

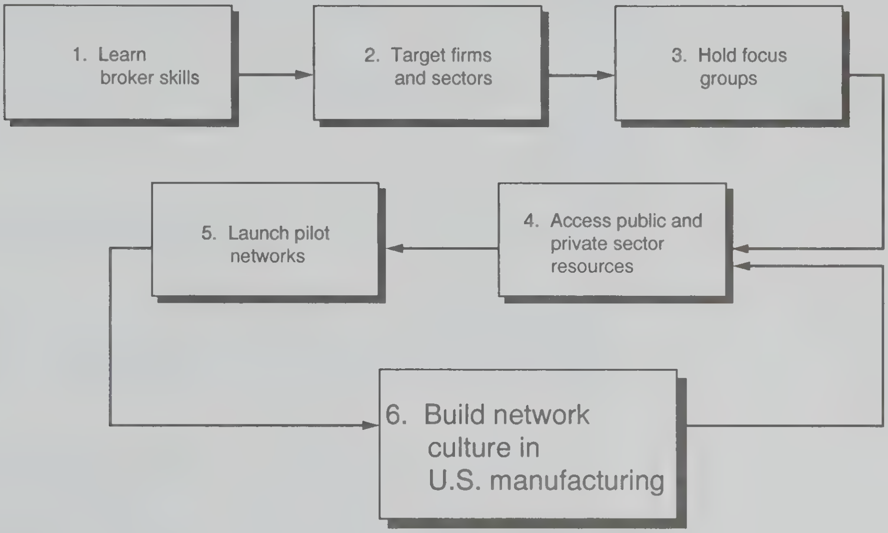
- Banks receive new deposits when they enter into an LGC agreement.

- LGC are free marketing agents for banks—because each LGC is looking to increase membership. Working with LGC, banks come to know key industries and are able to increase the penetration of their many financial products.

- Helping local industry results in good publicity.

SECTION SIX:

BUILDING A STRONG NETWORK CULTURE


1. Learn broker skills
2. Target firms and sectors
3. Hold focus groups
4. Access public and private sector resources
5. Launch pilot networks
6. Build network culture in U.S. manufacturing

A FEW GOOD NETWORKS WILL NOT SAVE THE MANUFACTURING SECTOR. BROKERS MUST LEARN TO ENCOURAGE LARGE NUMBERS OF FIRMS TO SEE COOPERATION AS THE KEY TO COMPETITIVENESS. THIS FINAL SECTION OF THE HANDBOOK DEALS WITH:

- RULES FOR SUCCESSFUL NETWORKS
- PRESS COVERAGE FOR SUCCESSFUL NETWORKS
- NETWORK FUNCTIONS AND STRUCTURES
- ANTI-TRUST AND OTHER LEGAL ISSUES
- NETWORK PITFALLS—AND HOW TO AVOID THEM

The time has come to move from pilot network projects—successful tests of interfirm cooperation—to the development of a strong network culture that will enable U.S. firms to compete with firms anywhere in the world.

This final section of the Handbook begins with a list of conditions that must be met if networks are to grow and prosper. Use it to review your current and future network projects.

RULES FOR BUILDING SUCCESSFUL NETWORKS

Sound networks are based on a consistent set of principles

The experience of brokers in the United States and abroad demonstrates that sound networks are based on a consistent set of principles:

- **Compatibility**—network firms must share business culture as well as business values and business objectives.
- **Critical mass**—real competitive advantage can only be achieved if all the capabilities required for customer satisfaction have been incorporated into the network.
- **Inseparability of returns**—if networks are not win-win situations, long term commitment to cooperation is unlikely.
- **Core of trust**—network project design and management must seek to build social ties and relationships of trust as well as commercial links if cooperation is to be sustained in hard times.
- **Business ownership early**—networks are often the idea of outsiders (brokers, consultants); member firms must be led quickly to take responsibility for success.
- **Sutton's Law (Go where the money is)**—networks that focus on common opportunities for profit will last; networks that move nimbly from niche to niche in search of profits will last longer.

The major issues that arise in the course of business cooperation must be surfaced and resolved early on

A corollary to these network axioms is that all the major issues that arise in the course of business cooperation—allocation of costs and profits, responsibilities of partners, exposure and liability, decision making and conflict resolution—must be surfaced and resolved early on. More discussion of network pitfalls follows.

GETTING GOOD PRESS

Good press coverage is important to your networks—and essential to you as you begin to expand from a few pilot networks to build a regional network culture.

Good coverage has two requirements: good press contacts and good news stories. Industry cooperation is always news, and network success stories make great copy. Your job now is to build press connections and learn to write press releases that attract editors' attention.

What papers do local manufacturers read?

1. ______________________________ Telephone ____________________

Address ______________________________

2. ______________________________ Telephone ____________________

Address ______________________________

3. ______________________________ Telephone ____________________

Address ______________________________

Who are the business editors and writers for the key papers?

	Editor	Writers
1.	______________________________	______________________________
2.	______________________________	______________________________
3.	______________________________	______________________________

What makes a press release effective?

- It is *news,* not editorial comment
- It is about local people and events
- It is concise—telling who did what, where, when, and why
- It comes with good photos
- It is addressed to a key newspaper staff person—along with a note that explains why they have been chosen to receive the story.

Don't forget about trade association newsletters and magazines—they reach your target audiences even better than daily newspapers.

LEGAL CONSIDERATIONS IN FORMING NETWORKS

When networks grow, it often becomes necessary to formalize their existence

Most networks begin in informal agreements to cooperate in order to be more competitive. However, when networks grow to critical importance, evolve into complex management problems, come to own real or intellectual property, or require infusions of outside capital, it becomes necessary to formalize their existence. There are a number of legal structures which may be used:

> **Contracts.** A set of contracts may ne used to define the rights and obligations of each network member.
>
> **Partnership.** The network members may form a general or limited partnership. This form has tax advantages, however, general partners do not enjoy limited liability.
>
> **Corporation.** A limited-liability corporation may be formed with network members (and others, if they wish) as shareholders, directors, and officers.
>
> **Cooperative.** A special form of corporation, cooperatives usually operate on an at-cost basis, distributing net proceeds annually to members.

Network firms planning to work together for more than one or a few transactions should seek expert legal counsel

An exchange of letters stating the rights and mutual responsibilities of network members is usually sufficient in the early going. All networks that plan to hire staff, acquire assets, and incur product liability exposure, should seek expert legal counsel.

Network agreements. The fundamental issues for network management are essentially the same as those for other types of collective enterprise (partnerships, joint ventures, cooperatives). Prominent among them are the need for agreements covering:

- Network mission and strategic objectives, i.e., a core business plan.
- Decision making and the resolution of conflicts.
- Responsibilities of individual firms to group projects (including provisions to remain competitive).
- Ownership of common assets and their distribution upon dissolution.
- Allocation of network costs and profits.
- Management of risk arising from product liability, warranty costs, personal injury, and other exposures.

NETWORK FUNCTIONS	TYPICAL NETWORK FORMS
TQM	Informal user groups
Workforce training	Nonprofit, tax-exempt corporation (set up, if possible, jointly with training institutions).
Process technology: • Development	Cooperative agreement (see the standard form used by federal laboratories for multi-firm projects).
• Shared use	Exchange of simple letter contracts describing individual firm's rights and obligations.
Product development	Joint venture—am independent corporation formed by network partners is best able to manage intellectual property rights.
Group Purchasing	Cooperative (agricultural coops are good models).
Group insurance	Nonprofit corporation
Manufacturing	Letter contracts; joint venture corporation
Finance	Loan guarantee cooperative
Marketing	Exchange of letters; cooperative.

AVOIDING ANTI-TRUST VIOLATIONS

The fundamental purpose of networks is competitiveness

Let's start by noting that the fundamental purpose of networks is competitiveness: in networks, firms cooperate in order to compete in markets previously closed to them. For this reason, we see no reason to think that the development of networks will lead to a decline in competition in the U.S. market.

Let's look at three models of inter-firm collaboration in order to understand possible concerns with antitrust violations:

1. Organization by small firms, with or without public sector assistance, of collective services such as joint worker training, gathering of export market information, or group quality certification.

This model deals essentially with what is called pre-competitive cooperation and raises no problems.

2. Horizontal combinations of small firms in the same industry, coming together for the purpose, for example, of common purchasing or marketing.

Horizontal combinations may pose problems as they may give the appearance of (or worse actually engage in) collusion in restraint of trade. If powerful enough in relation to their markets, they might, for example, fix prices or allocate contract work. The collusive practices of road construction companies are well described in the law.

Antitrust risk is essentially eliminated in the case of *small* firms operating in markets where they have minor market shares and numerous competitors

This risk is essentially eliminated in the case of *small* firms operating in networks in markets where they have minor market shares and numerous competitors. Small firms in traded sectors have essentially no ability to act in restraint of trade. Should they attempt to do so, foreign and domestic competitors will discipline them more quickly and thoroughly than the courts. Hence, they have little reason to fear government intervention. Even so, some antitrust attorneys have advised networks that to be completely safe they should avoid *excluding* competent firms, that their structure should be transparent to buyers, and that their internal bidding procedures must avoid discussion of costs or coordinated pricing policies—a *per se* violation of federal law. Note that common purchasing, especially by open membership cooperatives, is common across the United States. Bear in mind that antitrust rules do not generally apply to export activities.

Note that common purchasing, especially by open membership cooperatives, is common across the United States

3. Vertical consortia of small firms, usually having complementary process technologies, that form networks to either:

    a. bring proprietary goods to market, or
    b. attract OEM clients by offering an integrated set of manufacturing services.

Small firms joining together to design and produce *new products* face few legal problems

Small firms joining together to design and produce new products face few legal problems. If they are able to penetrate formerly oligopolistic markets as a result of network cooperation, their behavior is clearly pro-competitive in the eyes of the law.

Despite relative clarity about what firms can and cannot do under the law, there is no way to eliminate the possibility of third party suits from disgruntled competitors

In sum, it would be a mistake to conceive of networks as some new form of cartel with power to fix prices, control markets, or restrict the flow of innovations to customers. However, despite relative clarity about what firms can and cannot do under the law, there is no way to eliminate the possibility of *third party antitrust suits* from disgruntled competitors. Frivolous suits are not uncommon in this area of the law as they hold the promise of treble damages awards. Defense against such suits can easily entail crushing costs. As a result, small firms entering into networks need careful guidance. Brokers are well advised to bring in experienced antitrust attorneys when networks begin to be significant forces in the domestic markets they serve.

A BANK FOR COOPERATING NETWORKS

A National U.S. Network Bank

The National Cooperative Bank was created by Congress in the early 1980s to foster cooperative enterprise development. Its current assets exceed $500,000,000. In its early years, the Bank and its development finance affiliate, the NCB Development Corporation, focused on housing cooperatives and Employee Stock Ownership Plans (ESOPs). Recognizing the economic importance of manufacturing, the Bank is actively seeking networks as clients.

Cooperative Businesses

The National Cooperative Bank provides financial services to cooperative businesses, directly and in concert with local banks. The National Cooperative Bank is not a charitable institution. It finances cooperative businesses and seeks a fair return on its capital. A detailed business plan must be prepared for submission to the Bank's lending committee. Staff of the NCB Development Corporation can provide some assistance in the development of network business plans, but network brokers are expected to take the lead in compiling the necessary information.

For further information, contact:

Margaret Cheap
Executive Director
NCB Development Corporation
One Pine Street
Suite 2203
San Francisco, California 94111
415/399-0959

NETWORK PITFALLS—AND A CASE STUDY

There are several problems that must frequently be faced and solved in the process of building manufacturing networks. Several of the most common to watch out for are:

- **Inadequate time investment**—firms let brokers do the work, never adequately understand the network opportunity or their responsibilities, and drop out when some new business pressure comes along.

- **Opportunism**—firms sometimes take advantage of the network's dependence on them to raise prices or cut quality.

- **Wrong partners**—companies see a profit opportunity and jump into a network without careful scrutinizing of partners' probity, quality, commitment.

- **Failure to reach critical mass**—weak company plus weak company does not add up to network strength in competitive manufacturing industries.

- **Rigidity**—firms must understand at the outset that change is inevitable—and failure to adhere to a rigorous network plan is almost inevitable when firms are climbing up a steep learning curve.

Early in this Handbook, the importance of establishing a clear decision-making process and system for resolving conflicts was emphasized. Brokers were also advised to surface all potential pitfalls, if not at the first network meeting, then certainly soon after.

Brokers working with production networks may also have to confront conflicts over the allocation of profits, the right to raise prices when costs go up, the priority to be accorded to network jobs, and a variety of other business matters.

The following case study illustrates some of the key issues in network management. If you study it carefully, it will help to prepare you to deal with problems as they arise.

ROBOTICA
A Network Case Study

> The model that has driven regional industrial development we could call a model of *economies of scale at the level of the system and not of the individual firm....* We are talking about firms of very modest dimensions that do specialized work, but which in conjunction with one another bring to the market an infinity of different goods. The regional economy is like a magnificent industrial tinkertoy of almost infinite flexibility that is able to compete effectively with much larger firms.
>
> *Economist Romano Prodi, describing the network center of the world—the Italian region of Emilia-Romagna*

Flexible Network Manufacturing

The following case study focuses on network management issues—and especially the allocation of costs and benefits among member firms. These are issues that eventually arise in all business networks. Your job is to find equitable solutions to the problems you will read about in this case study.

ROBOTICA

Sergio Masoni stood up from his desk at FSM and looked out over the shop floor. Nearby, half a dozen workers were busily assembling an automated machine. Further away, across a polished concrete floor, three bright yellow robots twisted and turned, repeating their cycles over and over until time came to pronounce them fully tested and ready for export to the customer, an automobile maker in Spain.

While Sergio watched, a small truck pulled up. Alberto Righi, the owner of an electronics firm, was making a delivery: special control devices for a robot designed to work in the intense heat of a paint curing oven. Tomorrow Masoni's men could begin assembly and testing. This was important, thought Masoni. His ability to compete with big multinational robot companies like Fanuc depended on his capacity to make a customized product in a short time at a realistic cost. And that ability was based on the collaboration of a network of sophisticated small manufacturers like himself.

Finding a Niche

Sergio Masoni founded FSM in 1975 with one lathe, one milling machine, one apprentice, and one job—a contract from Fiat Tractor for axles. By 1978, he had his first numerically-controlled machine tools and twelve workers on his payroll.

When the recession hit, representatives of the big firms he supplied began putting pressure on prices. The common method was to pit small firm owners against one another. Money was tight. It was becoming clear that to survive, Sergio's shop was going to have to develop some special ability that would shield it from the buying power of a few large-scale customers.

Then Sergio was commissioned by COMAU, a big robot maker, to manufacture several sets of experimental "end effectors"—the steel hands used by robots to grasp and manipulate work-pieces. He made a successful effort to get more of COMAU's subcontract work and went out of his way to bring ideas about better and cheaper methods to COMAU's engineers. From them he learned about the expanding robot market.

It turned out there were many calls for one-off robots. These are the special ones that have to fit in a limited space, perform a curious task, or function under difficult conditions. Firms like COMAU and Japan's FANUC weren't set up to build these one-of-a-kind devices. Sometimes COMAU did it to satisfy a customer, but it couldn't come close to making a profit on this kind of work. Maybe, Sergio thought, they would prefer it if his firm helped out with the specialty end of the business. If so, he had found the market niche he had been seeking.

Robotica Begins

He couldn't do it alone. Masoni was good at making "end effectors." He didn't know much at all about machine design, frame construction, electronics, or software. All these special skills would need to be found—and carefully organized—without investing a lot of money.

Being part of "the magnificent tinkertoy" that is the Emilia-Romagna manufacturing system, and having long been a member of the key trade association, Sergio knew small firms that had production abilities he needed. But FSM itself had to change to be a key participant in the robot network.

Sergio began by adding a partner, enticing Rinaldo Pesce away from COMAU by the holding out the possibility of building a new company. Rinaldo Pesce was a technical college engineer with eight years experience in software development at COMAU.

Building the Network

Sergio conceived of a robot network whose core skills were to be marketing, systems design, production coordination, and installation and testing in the customer's factory. He set out to organize the needed specialties into a manufacturing network.

Silvano Brioschi has a great deal of experience with hydraulic devices. The company he started in the early 1970's is called Tecnoferm. With Scandinavian licenses, it makes materials handling equipment for the food processing industry. Tecnoferm's special skill is engineering design. Its small group of production workers focuses on hydraulic cylinders and valves—the heart of the mechanisms they sell. The rest is subcontracted. When their mutual trade association arranged a lunch with Masoni, both felt immediately that they could work together.

It was Brioschi who suggested Alberto Righi for the electronics work the robot network would require. Righi had gone into business for himself after 18 years at Olivetti. His last position with Olivetti was as a manager in the racing division, building and modifying telemetry equipment for Formula 1 racing teams. His solid reputation as a problem solver had helped him grow his company, MicroLex, from nothing to a technical staff of 14 in less than a year.

Robots need frames and casings as well as effectors and controls. Metal fabrication and welding had never been part of Sergio's enterprise. When he needed these manufacturing services, he ordinarily went down the road to Alberto Ciano. As Ciano was not equipped to do metal finishing, Sergio offered him a deal: if Ciano would install an environmentally safe powder painting system, Sergio would guarantee to keep it busy at least a third of the time. Ciano agreed.

Network Management Structure

The networks firms met over several excellent dinners to discuss marketing strategy, quality assurance, and production scheduling issues. Before long, they had given their network a name—Robotica.

Without much thought, the network partners agreed to share startup costs equally. On the basis of a handshake they went ahead with the construction of sample robots for trade show display and printing of a professionally produced brochure. As orders began to rise and the amount of money flowing through the network became notable, debates among the partners have become more intense. Major issues are rework and warranty costs, the division of profits, and the allocation of costs and cost savings.

Sergio is convinced that the time has come to draw up a detailed agreement among the network partners. He has his own ideas about networks. For example, Sergio believes that no network member firm should give more than 35 percent of its capacity to Robotica. This is both to avoid situations of dependency and to encourage members of the group to work with and learn from firms using new technologies. For example, the electronics and hydraulics firms in the network should make every effort to serve the advanced aircraft, machine tool, and scientific equipment sectors in order to keep abreast of the latest waves of innovation.

Sergio takes the position that new knowledge (for example of materials or manufacturing techniques) should be shared free of charge. Not all his network partners agree. He also believes that members of the network should use market prices (what would an outside firm charge?) to determine what to charge the network—and that profits should be shared pro-rata on the basis of the cost of work contributed. When the network partners meet, he will argue that cost savings realized by any partner should go entirely to lowering the sales price of the robots, thus enlarging the market.

Some say there is no way of tracking cost savings or knowing who is playing by the rules. Others argue that cost savings are the result of effort and ought to be retained. There is also no agreement about the meaning of pro-rata: is it based on direct labor and materials, or does it take special expertise into account? Should profit share be based on cost or contribution to margins? And how can any of these be quantified?

CASE STUDY ANALYSIS

Your job is to determine what an equitable network agreement should look like.

Begin by diagramming the Robotica network and considering the importance of each firm's contribution.

NETWORK DIAGRAM

Review the list of business issues mentioned in the final section of this case study. Add others, drawing on your own business experience.

BOX FOR LISTING ISSUES

PREPARE A BRIEF PROPOSAL FOR A FAIR AGREEMENT

LEVERAGE...TO BUILD A REGIONAL NETWORK CULTURE

One broker, working alone, can manage only a limited number of networks. A few, successful networks are, of course, a great way to start. But a small number of model networks will not revitalize the manufacturing sector. The real issue is scale—building the hundreds and thousands of effective networks that will make the difference in American industrial competitiveness.

The problem is leverage, finding ways to multiply your impact by mobilizing additional brokers, economic development organizations, and trade associations to organize networks. This is the time to stop, reflect on your experience, and make a plan to build a regional network culture.

1. List the most important organizations that should be—but aren't yet—active in the network effort.

2. What can you do to motivate these organizations and make them network development partners?

3. How can you increase your outreach to industry, getting more publicity for the network idea?

4. What sources of federal and state funds are available to support network projects?

5. What steps can you take to make sure state policymakers pay careful attention to manufacturing network strategies?

NETWORK NOTES

USEFUL BROKER CONTACTS

STATE AND FEDERAL NETWORK PROGRAMS AND CONTACTS

FUTURE NETWORK PROJECT IDEAS

APPENDICES

In Groups, Small Firms Can Function Like Large Ones

THE POWER OF MANUFACTURING NETWORKS

As America, led by its states, struggles to regain lost markets and protect communities and their jobs, the issue is not whether but how to aid manufacturing industries. Part of the answer may lie in the flourishing manufacturing networks of Italy and Denmark, which came about because of public determination to counter sharp declines in traditional manufacturing. Prof. C. Richard Hatch of the Center for Manufacturing Systems at New Jersey Institute of Technology, the leading American exponent of the network concept, has conducted many seminars and study trips on the subject, on several occasions with Fund support. In this article, he suggests far-reaching changes in the way state governments deliver services to industry, as well as gradual changes in the business culture itself.*

The overall competitiveness of american industry has come to rest squarely on the ability of existing small and medium-sized firms to meet the cost, quality, and delivery demands of major industrial customers. These smaller companies, which employ nearly two-thirds of the blue-collar labor force, now supply the bulk of the parts and component used in the production of finished goods for both domestic and export markets.

The proliferation of small manufacturing firms and the downscaling of big ones are creating significant challenges for economic development officials. It is one thing to negotiate the location of a branch manufacturing plant employing several thousand workers. It is quite another to service thousands of smaller enterprises in hundreds of different industries, each with specific technologies and markers to be mastered. Yet, as firm size goes down, the need for such assistance goes up; the traditional limitations of small firms—restricted access to capital, little or not R&D capability, lack of management depth and marketing savvy—are well known. The magnitude of the problem, the limited time remaining to reach competitive levels, and the shortage of public resources are driving home the need for new approaches.

Fortunately, the stewards of our state and city economies can turn to the prosperous small-firm economies of Europe for effective models. In southwestern Germany, inter-firm cooperation has greatly increased innovation and productivity in the textile machinery, automotive component, and electronics sectors. Denmark's furniture, apparel, and electronics industries are regaining their competitive edge in like fashion. And in Italy close-knit subcontracting networks permit very small companies to dominate sectors which at first glance appear more suited to large-scale production. One of the keys is the propensity if firms in these regions to link their complementary skills and share the costs of doing business in manufacturing networks.

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* This article originally appeared in *TransAtlantic Perspectives*, a publication of the German Marshall Fund of the United States, Number 22, Winter 1991

A manufacturing network is a group of firms that cooperate in order to compete—that collaborate to achieve together what each cannot alone. In networks, groups of independent companies can share overhead, access expensive technologies, and blend complementary capabilities to bring innovative products to new markets.

Networks coalesce around common needs and opportunities. Through participation in *service networks* dozens or even hundreds of firms share the costs of market forecasting, quality certification, materials purchasing, or financial management. Out of them blossom many *production networks*, in which a few or many small companies cooperate to exploit niche markets.

Emilia-Romagna: Epicenter of the Network System

The industrial model incorporating both types of networks emerged first in north-central Italy in the region of Emilia-Romagna, where bitter labor-management struggles in the late 1960s cut productivity and curtailed large firms' ability to respond to market shifts. The oil shocks of the 1970s and skyrocketing Third World debt hit the biggest employers—the farm machinery makers—particularly hard. At the same time, foreign competitors were making serious inroads into the traditional markets of the region's apparel and shoe producers.

Even so, over the next dozen years the explosive growth of small enterprises in the region's principal cities - Bologna, Modena, Reggio, Parma, Carpi - Paralleled the steep loss of mass production jobs. The key was the spread of manufacturing networks. Out of necessity, the regional government, in collaboration with labor and trade associations, learned how to foster cooperating systems of small and medium sized firms, bringing them together around shared services until strong commercial ties could give them a life of their own.

In Carpi, for examples, economist Loredana Ligabue conceived a plan to provide vital management services to knitwear firms and she arranged for financial backing, first from the European Community's Social Fund and then from the regional government. Her description of the creation of the "network hub" called CITER is instructive:

"I talked first to firm owners. On the basis of the problems and opportunities we identified, we set up CITER to help move the Carpi knitwear industry to a higher plane. First, we worked on product change—higher fashion—so that we could ask higher prices. Second, we had to introduce new technologies to fill the niche we had chosen, Third, we needed to expand our markets and move away from dependence on Germany. We gathered the best market information from around the world (at prices individual firms couldn't afford), organized trade missions, disseminated information—all of these things done always in groups."

Today CITER provides sophisticated international fashion forecasting and technical services to more than 600 dues paying member firms. None of the little firms in the Carpi knitwear district could afford even one of the expensive consultants readily available in Manhattan or Milan, but 600 of the together are able to access the very best services.

In the Emilia-Romagna region's dense industrial districts, small firms routinely combine resources to produce and export machine tools, automatic machinery, motor cycles, automobiles, electronic controls, agricultural equipment, ceramic tiles, furniture, shoes, knitwear and clothing of all kinds. The owners of these firms describe themselves in quite the same terms used by the American counterparts: they are fiercely individualistic and highly competitive. They vie for positions in the best networks, not because they are culturally attuned to cooperation, but because they are always on the lookout for ways to enter new markets or increase margins. As a result, in ten years, the region of Emilia-Romagna has moved up to the top in national income rankings and to eighth position in all of Europe, putting it on par with high Scandinavian levels and well above any region of the United States.

To some early observers, it seemed that Emilia-Romagna's little firms might simply have found a few fortuitous niches. It is now clear that, in fact, aided by professionally staffed trade associations and decentralized sectoral service centers, they have created a system of production that fits precisely with the forces that are reshaping manufacturing worldwide. The onset of narrowly segmented markets and arrival of computerized production systems have greatly magnified the difficulties faced by larger companies whose management practices and technological choices often inhibit rapid innovation and efficient small batch manufacturing—the forte of network firms.

Denmark: Overcoming the Limitations of Size

In Denmark, too, many small firms have gotten engaged in networks because this kind of collaboration contributes measurably to the bottom line. A country of five million people facing the impending single European market with most of its blue-collar workers in very small firms, Denmark launched a national network program in 1989.

The Ministry of Industry set aside $140 million over three years for industrial modernization, export promotion, and network development. As a first step, key industry consultants from both public and private sectors were run through an intensive training course to become "network brokers". In the course potential brokers learned how to organize competing firms, spot mutual business opportunities, assess modernization needs, and coordinate group services.

At the same time, a multiphase program of challenge grants was announced. Phase One offered groups of firms up to $7,500 to conduct network feasibility studies. To apply, only a simple letter signed by three or more firms was required. Later phases have provided larger grants for long term group projects such as production coordination systems, export marketing, and new product development.

The initial outreach to business included direct mailings to every manufacturer in the country, full page newspaper ads, regional conferences co-hosted with trade associations—even television talk shows.

Last July the Danish government announced that the Network Program had taken on a life of its own and become "self propelling." In one year, 3,000 companies had been catalyzed into active participation. The strategic alliances they have formed are giving them the critical mass they need to develop a diversified array of new products for export—from hotel furnishings to integrated diagnostic equipment to turnkey golf courses.

The Network Program is changing two things in Denmark—two things that must also change in the United States. The first is the way government delivers services to industry, and the second is business culture itself. Instead of deciding what business needs and staffing a project to provide it, the Danish Ministry is saying, "Manufacturers, define your problems. Tell us in which markets you wish to compete and now we can help you do it well—for your benefit and that of the country as a whole." At the same tie, the owners and managers of Danish companies are being encouraged to change the way they think about the balance between cooperation and competition. Increasingly, they are turning to one another for the knowledge, skills and support needed to adopt new technologies and compete successfully in the single global marketplace.

Working Principles for a Network Strategy

The Danish and Italian efforts to strengthen the small firm manufacturing sector contain important lessons for the United States. In fact, a constant set of principles guides economic development policy in Europe's network regions from Sweden's Smaland to Baden-Wurttemberg to Barcelona and Bologna. They are also being applied with good results in fledgling American initiatives.

The Profit Incentive Principle. European regions drive modernization by identifying profitable business opportunities for local firms. The entrepreneurial energy they arouse in those firms and among local innovators is channeled into discussions about "best practice" manufacturing methods—creating a taste for advanced technologies. This is the reverse of the usual U.S. practice which first transfers technology to the firms, and then hopes that the new capabilities will eventually find a market outlet.

The Efficiency Principle. States must learn to stretch their investments if they are to reach thousands of firms in the next few years. No government has the resources to do this using the direct supplier route, "selling" its services to one firm at a time. But government can, in effect, wholesale quality assistance to groups of firms. The Michigan Modernization Service, for example, learning from European experience, worked closely with local trade associations, responding to needs their members identified. Many states are now beginning to bring individual client firms together around common interests in training, marketing, and technological innovation.

The Principle of (Maximum Feasible) Participation. The best way to get industry involved in continuous modernization is to put it in charge of the process. This shift of focus in service planning and delivery—from supply side to demand side—is the central lesson Italy's recent industrial renaissance offers us. Customer participation is currently the subject of key experiments here, as Oregon, Connecticut, Massachusetts and other states use challenge grants to motivate firms to come together, build their capacity to articulate needs, and define solutions. In doing so, these states are taking the first steps in creating powerful partnerships for long-term competitiveness.

The Principle of Sustainability. U.S. states tend to offer industry assistance free of charge. Because financial resources are limited, programs remain small. Collecting fees for service could help good programs grow. European modernization efforts often start with low fees and raise them gradually as new services demonstrably contribute to profits. This practice not only uses price mechanisms to ensure that services are client-driven, but sets each program on a financial path that will eventually make it self-sustaining.

The Principle of Cooperation. In the American business culture, individual companies are expected to cope by themselves with the massive changes occurring in the competitive environment. Regardless of size, U.S. firms must independently manage worker training, procurement, manufacturing operations, R&D, marketing, and sales.

One reason more and more foreign manufacturing economies are gaining on us is that they are fostering a different kind of industrial system, one in which cooperation forms the basis for competitive success. In Italy, Denmark, Japan, and other countries, public sector agencies and trade associations actively promote independent relationships among firms. In the process, they have created the group clients for public sector services that the efficiency principle demands. In line with the principles of sustainability, participation, and cooperation, the networks they have helped to form are always market-driven and industry-led.

U.S. Firms Turning to Networks in pursuit of Competitiveness

The power of the network to help small firms apply new technology, improve quality, and enter succeed in new, faraway markets may soon be seriously tested in the United States, Consider as evidence:

- In Montana, a new network links diverse manufacturing enterprises owned by seven Indian tribes. At present, these operations mainly serve protected Department of Defense markets, and the tribes are eager to see them succeed in nonprotected commercial markets. The network is being asked to clarify the principal technological, marketing, and training barriers to be overcome.
- On the Minnesota-Dakotas border, forty firms have incorporated the Tri-State Manufacturers Association to help one another modernize and diversify and to preserve their rural communities. TSMA's first project, done in conjunction with a local technical college, was a course in total quality management for workers and managers.
- Fall River and New Bedford, Massachusetts, apparel contractors formed the Needle Trades action Project five years ago to stem further erosion of their industry. Their cooperative efforts in market development, skill training, and day care have improved the quality of work life as well as firm productivity.

- Six metal fabricating firms in central Maine are working to design, produce and market a new type of road sanding device that has serious export potential. Further north, machinery manufacturers have set up a shared computer aided design station with a grant from the state's Science and Technology Commission. Individually too small to afford the cost of a skilled operator, these firms have increased their competitiveness by sharing staff and technology.
- In Oregon, a network of small book publishers shares production equipment, marketing and distribution to reach the national market.
- In Connecticut, small precision machine shops have banded together to buy heat treating services, saving both money and time—and keeping them on key OEM vendor lists.
- In the Florida Panhandle, 50 defense industry subcontractors got the message from a network conference sponsored by the Southern Technology Council. Now they market their combined capabilities-and have successfully penetrated new, high-value-added markets.

First Step for Any State: Recruit Brokers

Projects underway in a dozen U.S. states demonstrate the receptivity of American business to network strategies. But a few model networks cannot measurably affect regional wealth or national competitiveness. Thousands more are needed.

Faced with the need to move swiftly on modernization, any state's first step is to recruit knowledgeable and trusted individuals—from state agencies, local economic development organizations, trade associations, community colleges, and university extension projects—for training as network brokers. In the process of helping manufacturing firms help themselves, the broker has well established tasks:

Get them talking. Establish regular communication among firms, and between firms and those with whom they need to cooperate—business service providers, labor unions, marketing specialists, product designers, university laboratories, equipment manufacturers, and customers.

Deploy skills, not firms. View firms as "packets of skill and equipment" that can be deployed, in changing network combinations, in response to market signals. For example, when a hanger manufacturer is seen as a plastic injection molder, and a breadbox maker as a metal-forming firm, it is possible to envision forms of cooperation that could move them into new markets.

Spot common needs. Identify critical problems for sector competitiveness through constant contact with firms and their markets. Common needs are the basis for collective solutions.

Work toward hubs. Turn what is learned about obstacles to growth into specialized services—services that no small firm could possibly afford except through network participation. These crucial collective services will be the hubs around which network cooperation coalesces.

In this era of rapid technological change and fierce competition, many American manufacturers are at risk. Given the need to modernize thousands of small firms in a short time, state governments would be well advised to concentrate their resources on coordinating services to groups of firms, providing strategic information on growing markets, and catalyzing manufacturing networks. This will require a reorientation of state economic development policies and new emphasis on helping U.S. manufacturing firms help themselves.

With committed brokers and forceful leadership, business-government collaboration and network cooperation could expand fast enough and broadly enough to protect our existing endowment of manufacturing firms and, on that base, rebuild a thriving industrial economy.

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